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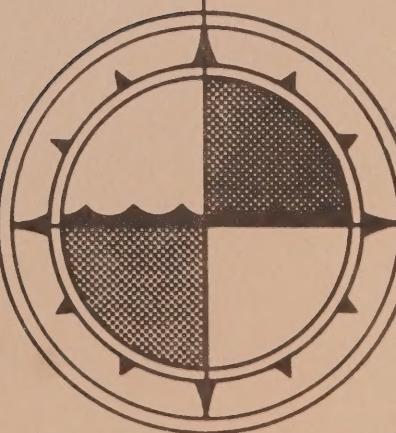
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OCEANOGRAPHIC OBSERVATIONS  
AT OCEAN STATION P  
28 July - 13 September 1978  
Volume 93



Canada

INSTITUTE OF OCEAN SCIENCES, PATRICIA BAY  
Sidney, B.C.



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OCEANOGRAPHIC OBSERVATIONS AT OCEAN STATION P

28 July - 13 September 1978

Volume 93

between wind speeds and tidal deflections at eight locations off the coast of Oregon and greater Puget Sound. Measurements of physical, chemical, biological, and geological parameters were made. The weathering of ocean sediments by precipitation at Ocean Station P was also determined. Data, on a routine continuing basis, from the oceanographic observatory were collected, including surface observations and profiles extending with depth, water and conductivity-temperature-pressure measurements.

Institute of Ocean Sciences, Patricia Bay

Sidney, B.C.

1979

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ABSTRACT

Physical, chemical and biological oceanographic observations are made from the weathership at Ocean Weather Station Papa, and between Esquimalt and Station Papa, on a routine continuing basis. Physical oceanography data only are shown, including surface observations and profiles obtained with bottle casts and conductivity-temperature-pressure instruments.



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## INTRODUCTION

Canadian operation of Ocean Weather Station P (Latitude  $50^{\circ}00'N$ , Longitude  $145^{\circ}00'W$ ) was inaugurated in December, 1950. The station is occupied primarily to make meteorological observations of the surface and upper air and to provide an air-sea rescue service. The station is manned by two vessels operated by the Marine Services Branch of the Ministry of Transport. They are the CCGS Vancouver and the CCGS Quadra. Each ship remains on station for a period of six weeks, and is then relieved by the alternate ship, thus maintaining a continuous watch.

Bathythermograph observations have been made at Station P since July, 1952. A program of more extensive oceanographic observations commenced in August 1956. This was extended in April, 1959 by the addition of a series of oceanographic stations along the route to and from Station P and Swiftsure Bank. These stations are known as Line P stations. The number of stations on Line P has been increased twice and now consists of twelve stations (Fig. 1). Bathythermograph observations and surface salinity sample collections, in addition to being made on Line P oceanographic stations, are also made at odd meridians at  $40'$ , i.e.  $139^{\circ}40'W$ ,  $141^{\circ}40'W$ , etc. These stations are known as Line P BT stations. Data observed prior to 1968 have been indexed by Collins et al (1969).

The present record includes STD and surface salinity and temperature data collected from the CCGS Vancouver during the period 28 July to 13 September 1978.

All physical oceanographic data have been stored by the Marine Environmental Data Services Branch (MEDS), Department of Fisheries and Oceans, 240 Sparks Street, 7<sup>th</sup> Floor West, Ottawa, Ontario, Canada, K1A 0E6. Requests for these data should be directed to MEDS.

Biological and productivity data are published in the Manuscript Report series of the Department of Fisheries and Oceans (DFO), Pacific Biological Station, Nanaimo, British Columbia, Canada. Requests for these data should be directed to DFO.

Marine geochemical data are for the Ocean Chemistry Division, Department of Fisheries and Oceans, Institute of Ocean Sciences, P.O. Box 6000, Sidney, B.C., Canada, V8L 4B2.

PROGRAM OF OBSERVATION FROM CCGS VANCOUVER, 28 July - 13 September 1978 (P-78-6)  
(MEDS Ref. No. 15-78-006)

Oceanographic observations were made by the officers and crew of the CCGS Vancouver.

En Route to Station P

No STD casts were taken.

Surface bucket or seawater loop samples for salinity were taken.

The surface temperature recorder and thermosalinograph were run continuously.

XBT's were taken at all whole and half Line P stations.

On Station P

The oceanographic program was carried out as follows:

Physical Oceanography

- 1) Thirty-six STD casts to 1400 metres were taken.
- 2) BT's or XBT's were taken every three hours to coincide with meteorological observations, encoded and transmitted according to the IGOSS format.

Marine Geochemistry

- 1) Forty-two air CO<sub>2</sub> samples.
- 2) Twenty-four PCO<sub>2</sub> samples.
- 3) Thirty-one alkalinity samples.
- 4) Thirty-six total CO<sub>2</sub> samples.
- 5) Sixty-six nutrient samples.
- 6) Three tritium samples.

Biological Oceanography

- 1) Samples were obtained from 150 metre vertical plankton hauls.

En Route from Station P

STD casts were taken at all Line P whole stations.

Surface bucket or seawater loop samples for salinity were taken.

The surface temperature recorder and thermosalinograph were run continuously.

BT's or XBT's were taken at all whole and half Line P stations.

Observations for Other Agencies

- 1) Marine mammal observations were made by the ship's officers for Mr. I. McAskie, Department of Fisheries and Oceans, Pacific Biological Station, Nanaimo, B.C., Canada.
- 2) Bird observations were made by the ship's officers for Dr. M. Myres, University of Alberta, Calgary, Alberta, Canada and Mr. J. Guiget, Curator of Birds and Mammals, Provincial Museum, Department of Provincial Secretary and Travel Industry, Victoria, British Columbia, Canada.
- 3) Air CO<sub>2</sub> samples were taken weekly in duplicate for Scripps Institution of Oceanography , La Jolla, California, U.S.A.

Data were processed for publication by Interact Computing Services Ltd., Victoria, B.C.

OBSERVATIONAL PROCEDURES

The daily surface water temperatures were measured from a bucket sample using a deck thermometer of  $\pm 0.1^{\circ}\text{C}$  accuracy. The daily surface salinity samples were obtained from the seawater loop. When the seawater loop was not operational these samples were obtained with a bucket, and are indicated with a '\*' in this data record.

Salinity determinations were made ashore with a Guildline Autosal salinometer. Accuracy using duplicated determinations is estimated to be  $\pm 0.003\text{‰}$ .

Line P engine intake continuous temperature on both ships was recorded by a Honeywell Electronik 15 Recorder. The temperature probe is at a depth of approximately 3 metres below the sea surface and the instrument accuracy is believed to be  $\pm 0.1^{\circ}\text{C}$ .

Each ship is equipped with a Plessey Model 6600-T thermosalinograph which is used, on Line P, for continuous recording of surface temperatures and salinities from the ship's seawater loop. The temperature probe is mounted at the seawater loop intake (approximately 3 metres below the surface) and the salinity probe and recorder are situated in the dry lab. The accuracy

of this instrument is believed to be  $\pm 0.1^{\circ}\text{C}$  for temperature and  $\pm 0.1^{\circ}/\text{oo}$  for salinity.

STD profiles were taken with a Guildline Model 8700 STP system.

### COMPUTATIONS

Analog traces from the salinity-temperature-pressure instrument have been digitized using a Hewlett-Packard (HP) 9821A calculator and an HP 9864A digitizer, then replotted by a HP 9862A plotter. Digitization was continued until original and computer plotted traces were coincident.

The HP 9821A was then connected to a HP 2116 minicomputer and the digitized data transferred to 9-track tape. Using a UNIVAC 1106 computer the data was listed and obvious spikes removed, then a correction was applied.

Generally the correction is determined by comparison with hydrographic casts of the same cruise. As no hydrographic casts were taken, the STD data was compared with hydrographic casts, taken at Station P, from the latter part of cruise 78005 and the earlier part of cruise 78007. Also a comparison was made with the mean of all hydrographic cast data taken at station P, during the month of August, between 1956 and 1976. Due to the manner in which the correction was determined no estimate of error is given.

Correction applied to STD data to produce data in this report:

PRESS	TEMP	SAL
0db	$-0.01^{\circ}\text{C}$	$-0.23^{\circ}/\text{oo}$
1200db	$+0.25^{\circ}\text{C}$	$-0.12^{\circ}/\text{oo}$

For other pressures linear interpolation was used.

Temperature and salinity values were listed at standard pressures and plotted using a CALCOMP 565 offline plotter.

Data values which we suspect but which we have included in this data record are indicated with a plus. These data have been removed from magnetic tape records.

The headings for the data listings are explained as follows:

PRESS	is pressure (decibars)
TEMP	is temperature (degrees Celsius)
SAL	is salinity (parts per thousand)
DEPTH	is reported in metres
SIGMA-T	is specific gravity anomaly
SVA	is specific volume anomaly
THETA	is potential temperature (degrees Celsius)
SVA (THETA)	is potential specific volume anomaly

DELTA D        is geopotential anomaly (J/kg)  
POT EN        is potential energy in units of  $10^8$  ergs/cm<sup>2</sup>  
SOUND        is the velocity of sound in m/sec

#### REFERENCES

Carpenter, J.H., 1965. The Chesapeake Bay Institute technique for the Winkler dissolved oxygen method. Limnol. and Oceanogr. 10, 141-143.

Collins, C.A., R.L. Tripe, D.A. Healey and J. Joergensen, 1969. The time distribution of serial oceanographic data from the Ocean Station P programme. Fish. Res. Bd. Can. Tech. Rept. No. 106.

MacNeill, M., 1977. A study of anomalous salinity and oxygen values in the deep water at Ocean Station P from 1960-1976 (unpublished manuscript) Pacific Marine Science Report 77-9.

Reiniger, R.F. and C.K. Ross, 1968. A method of interpolation with application to oceanographic data. Deep Sea Res. 15, 185-193.

U.S.N. Hydrographic Office, 1955. Instruction Manual of Oceanographic Observations. Publ. No. 607.

LOG OF HYDROGRAPHIC AND STP OBSERVATIONS

Consec #	Station	Date (Z)	Time (Z)	STP (m)	Hydrocast (m)	Comments
001	P	31/07/78	1850	1400		
002	P	01/08/78	2315	1400		
003	P	02/08/78	1717	1400		
004	P	03/08/78	2317	1400		
005	P	04/08/78	1727	1400		
006	P	05/08/78	1717	1400		
007	P	06/08/78	1718	1400		
008	P	12/08/78	2320	1400		
009	P	13/08/78	1712	1400		
010	P	14/08/78	1710	1400		
011	P	15/08/78	2330	1400		
012	P	16/08/78	1729	1400		
013	P	17/08/78	2305	1400		
014	P	18/08/78	1730	1400		
015	P	19/08/78	2305	1400		
016	P	20/08/78	1730	1400		
017	P	21/08/78	2312	1400		
018	P	22/08/78	1731	1400		
019	P	21/08/78	2305	1400		
020	P	24/08/78	1735	1400		
021	P	25/08/78	2010	1400		
022	P	26/08/78	1715	1400		
023	P	27/08/78	2325	1400		
024	P	28/08/78	1730	1400		
025	P	29/08/78	2345	1400		
026	P	30/08/78	1810	1400		
027	P	31/08/78	2330	1400		
028	P	01/09/78	1730	1400		
029	P	02/09/78	2342	1400		
030	P	03/09/78	1750	1400		
031	P	04/09/78	2325	1400		
032	P	05/09/78	1712	1400		
033	P	06/09/78	1550	1400		
034	P	07/09/78	1529	1400		
035	P	07/09/78	1717	1400		
036	P	09/09/78	2312	1400		
037	12	10/09/78	2017	1400		
038	11	11/09/78	0512	1400		
039	10	11/09/78	1222	1400		
040	9	11/09/78	2005	1400		
041	8	12/09/78	0200	1400		
042	7	12/09/78	0900	1400		
043	6	12/09/78	1705	1400		
044	5	12/09/78	2315	1400		
045	4	13/09/78	0315	1400		
046	3	13/09/78	0712	1400		
047	2	13/09/78	0950	90		
048	1	13/09/78	1145	95		

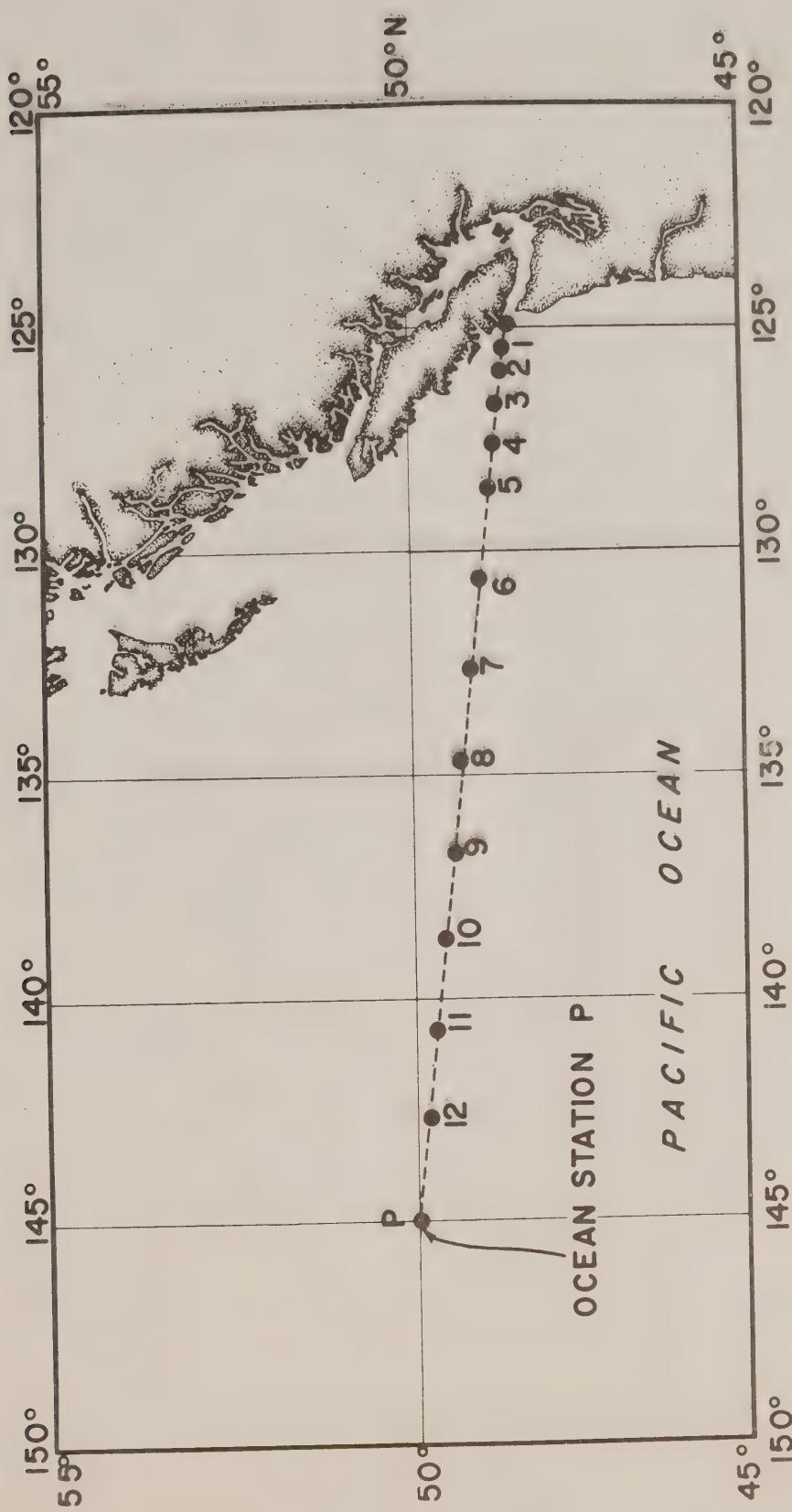


Fig. 1 Chart showing Line P station positions.

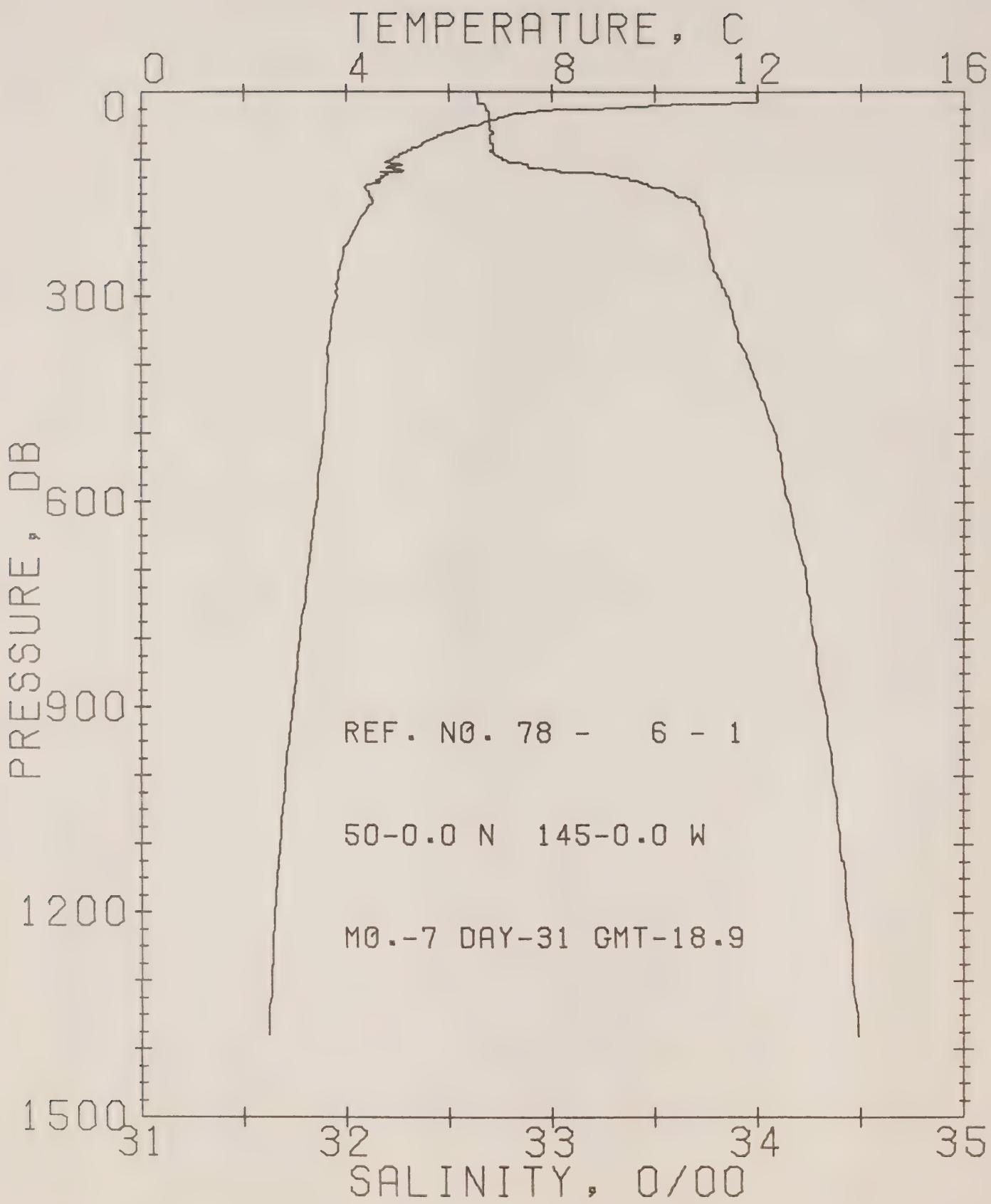


Oceanographic Data Obtained on Cruise P-78-6  
(MEDS Reference No. 15-78-006)



Results of STD observations

(P-78-6)



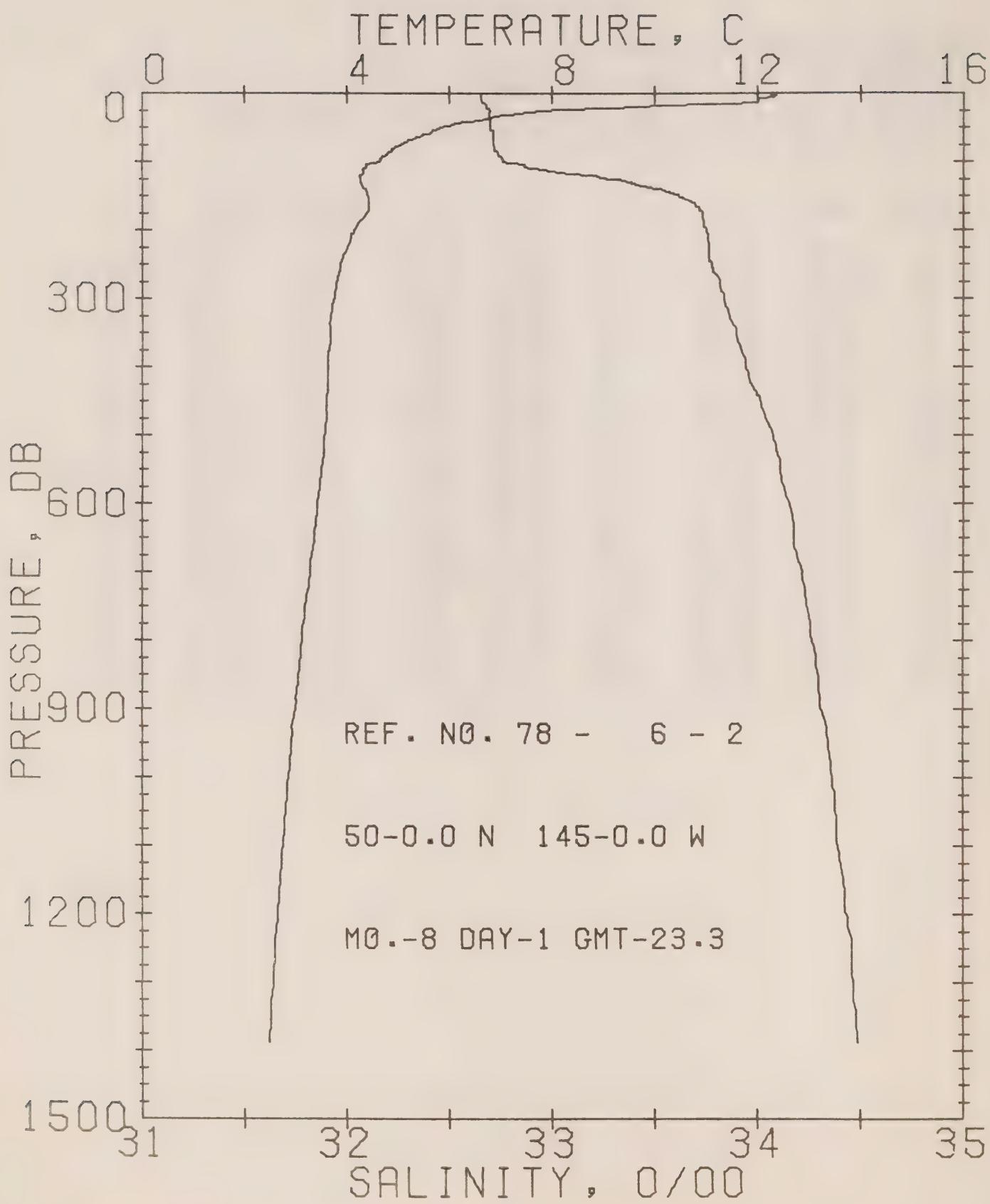
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 1 DATE 31/ 7/78

POSITION 50- .0N, 145- .0W GMT 18.9

RESULTS OF STP CAST 269 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.98	32.63	0	24.78	317.9	.00	.00	1494.
10	11.98	32.64	10	24.78	317.4	.32	.02	1495.
20	10.10	32.67	20	25.14	283.6	.63	.06	1488.
30	7.68	32.68	30	25.53	247.0	.89	.13	1479.
50	6.51	32.69	50	25.69	231.7	1.37	.32	1475.
75	5.49	32.70	75	25.82	219.2	1.92	.68	1471.
100	4.88	32.76	99	25.94	208.3	2.46	1.16	1469.
125	4.73	33.34	124	26.41	163.4	2.94	1.70	1470.
150	4.45	33.60	149	26.65	141.5	3.31	2.23	1469.
175	4.37	33.71	174	26.75	131.9	3.65	2.79	1470.
200	4.17	33.74	199	26.79	128.1	3.98	3.41	1469.
225	3.99	33.76	223	26.83	124.9	4.29	4.09	1469.
250	3.89	33.78	248	26.85	122.8	4.60	4.84	1469.
300	3.83	33.86	298	26.92	116.6	5.20	6.52	1469.
400	3.64	33.97	397	27.02	107.4	6.32	10.51	1470.
500	3.56	34.08	496	27.13	98.5	7.36	15.24	1472.
600	3.41	34.15	595	27.19	92.9	8.31	20.60	1473.
800	3.08	34.28	793	27.32	81.3	10.05	32.93	1475.
1000	2.80	34.37	990	27.42	72.6	11.58	47.00	1477.
1200	2.60	34.44	1188	27.49	66.6	12.97	62.55	1480.



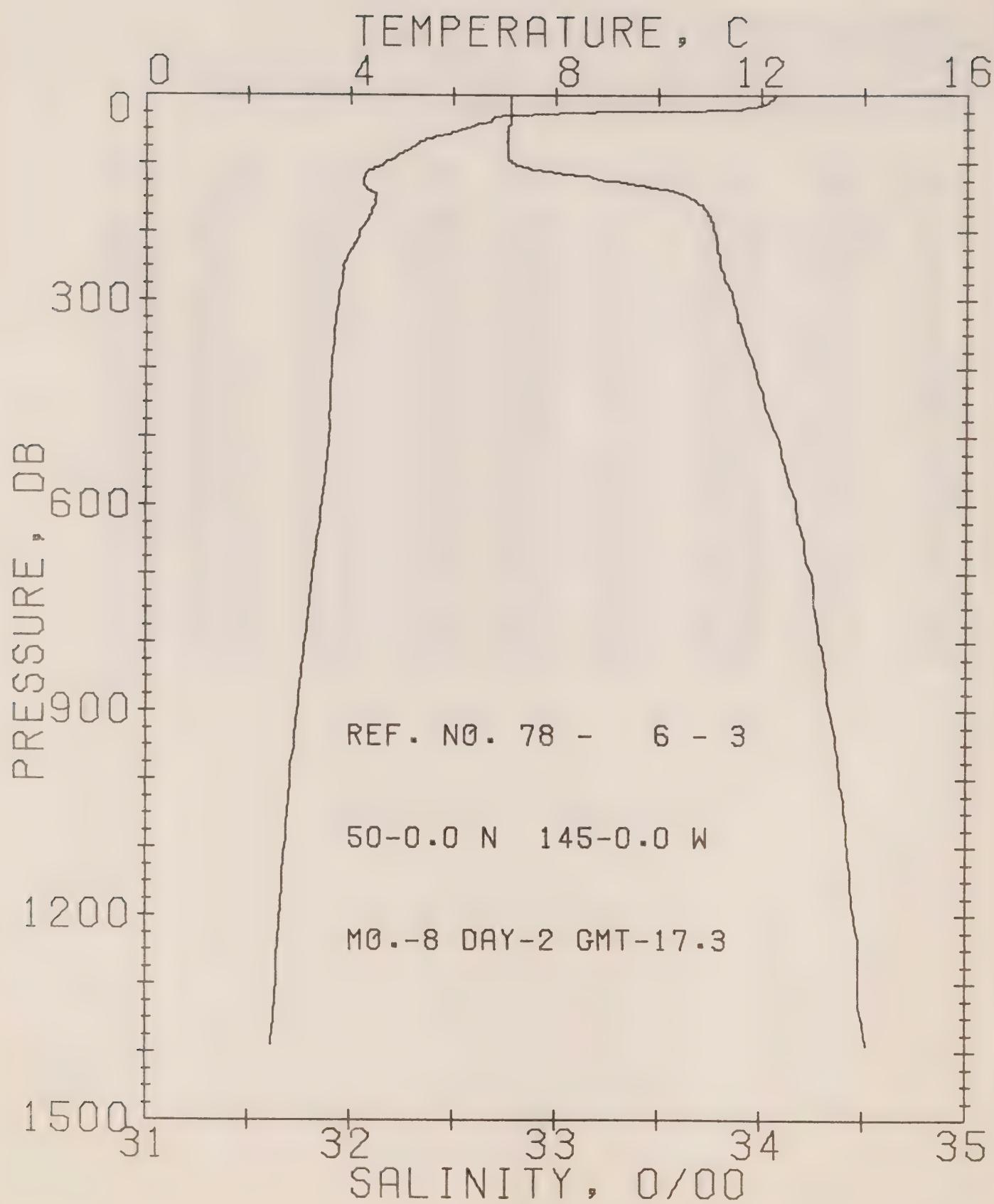
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 2 DATE 1/ 8/78

POSITION 50- .0N, 145- .0W GMT 23.3

RESULTS OF STP CAST 306 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.29	32.65	0	24.73	322.0	.00	.00	1496.
10	12.03	32.65	10	24.79	317.2	.32	.02	1495.
20	9.67	32.68	20	25.22	276.1	.62	.06	1487.
30	7.37	32.69	30	25.57	242.4	.88	.13	1478.
50	5.88	32.70	50	25.78	223.4	1.34	.31	1472.
75	5.05	32.71	75	25.88	213.6	1.88	.66	1469.
100	4.61	32.76	99	25.97	205.4	2.41	1.13	1468.
125	4.26	33.27	124	26.41	163.8	2.87	1.66	1468.
150	4.41	33.61	149	26.67	139.7	3.24	2.18	1469.
175	4.38	33.73	174	26.76	131.0	3.58	2.74	1470.
200	4.14	33.75	199	26.80	127.2	3.90	3.35	1469.
225	4.00	33.77	223	26.83	124.5	4.22	4.03	1469.
250	3.88	33.78	248	26.85	122.7	4.53	4.78	1469.
300	3.75	33.84	298	26.91	117.3	5.13	6.46	1469.
400	3.63	33.95	397	27.01	108.6	6.25	10.47	1470.
500	3.56	34.08	496	27.12	99.2	7.30	15.24	1472.
600	3.42	34.16	595	27.20	92.2	8.26	20.63	1473.
800	3.11	34.27	793	27.31	82.3	10.01	33.07	1475.
1000	2.85	34.37	990	27.42	73.4	11.56	47.27	1478.
1200	2.64	34.43	1188	27.49	67.3	12.97	63.04	1480.



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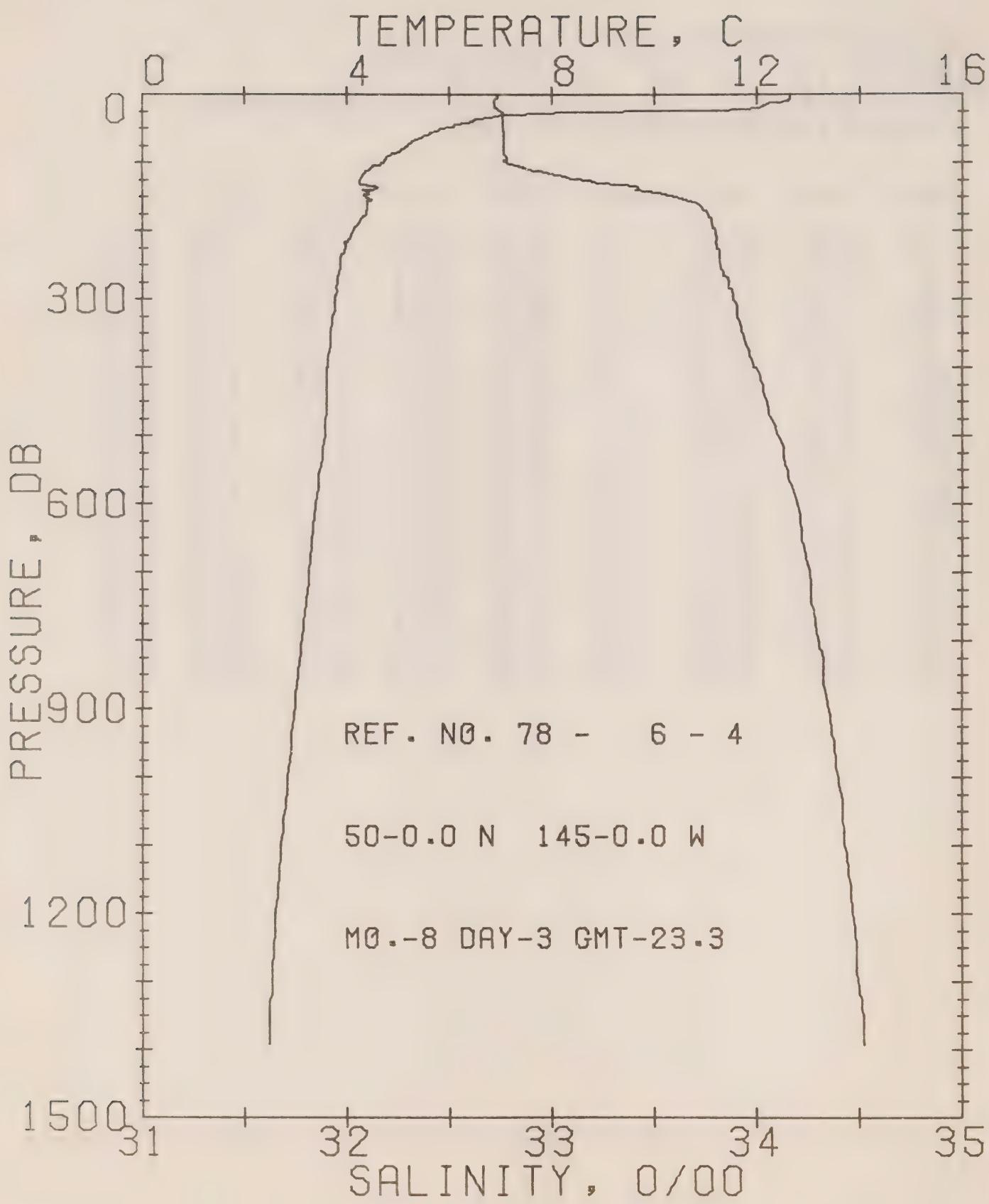
DATE 2/ 8/78

POSITION 50- .0N, 145- .0W GMT 17.3

RESULTS OF STP CAST 292 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED. PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.27	32.78	0	24.84	312.0	.00	.00	1496.
10	12.15	32.78	10	24.86	310.1	.31	.02	1495.
20	11.63	32.78	20	24.96	301.1	.62	.06	1494.
30	7.30	32.78	30	25.65	234.8	.88	.13	1478.
50	6.22	32.77	50	25.79	222.2	1.33	.31	1474.
75	5.22	32.77	75	25.91	211.0	1.87	.66	1470.
100	4.64	32.79	99	25.99	203.5	2.39	1.12	1468.
125	4.24	33.23	124	26.38	166.6	2.86	1.65	1468.
150	4.48	33.65	149	26.68	138.1	3.23	2.17	1470.
175	4.38	33.74	174	26.77	130.3	3.56	2.72	1470.
200	4.16	33.77	199	26.82	125.7	3.88	3.33	1469.
225	4.02	33.79	223	26.85	123.2	4.19	4.00	1469.
250	3.85	33.80	248	26.87	120.8	4.50	4.74	1469.
300	3.77	33.87	298	26.93	115.3	5.09	6.39	1469.
400	3.63	33.97	397	27.03	106.7	6.20	10.36	1470.
500	3.58	34.08	496	27.12	98.9	7.23	15.09	1472.
600	3.43	34.17	595	27.21	91.6	8.19	20.44	1473.
800	3.10	34.29	793	27.33	80.6	9.90	32.63	1475.
1000	2.83	34.39	990	27.44	71.5	11.42	46.48	1477.
1200	2.62	34.46	1188	27.51	65.3	12.78	61.78	1480.



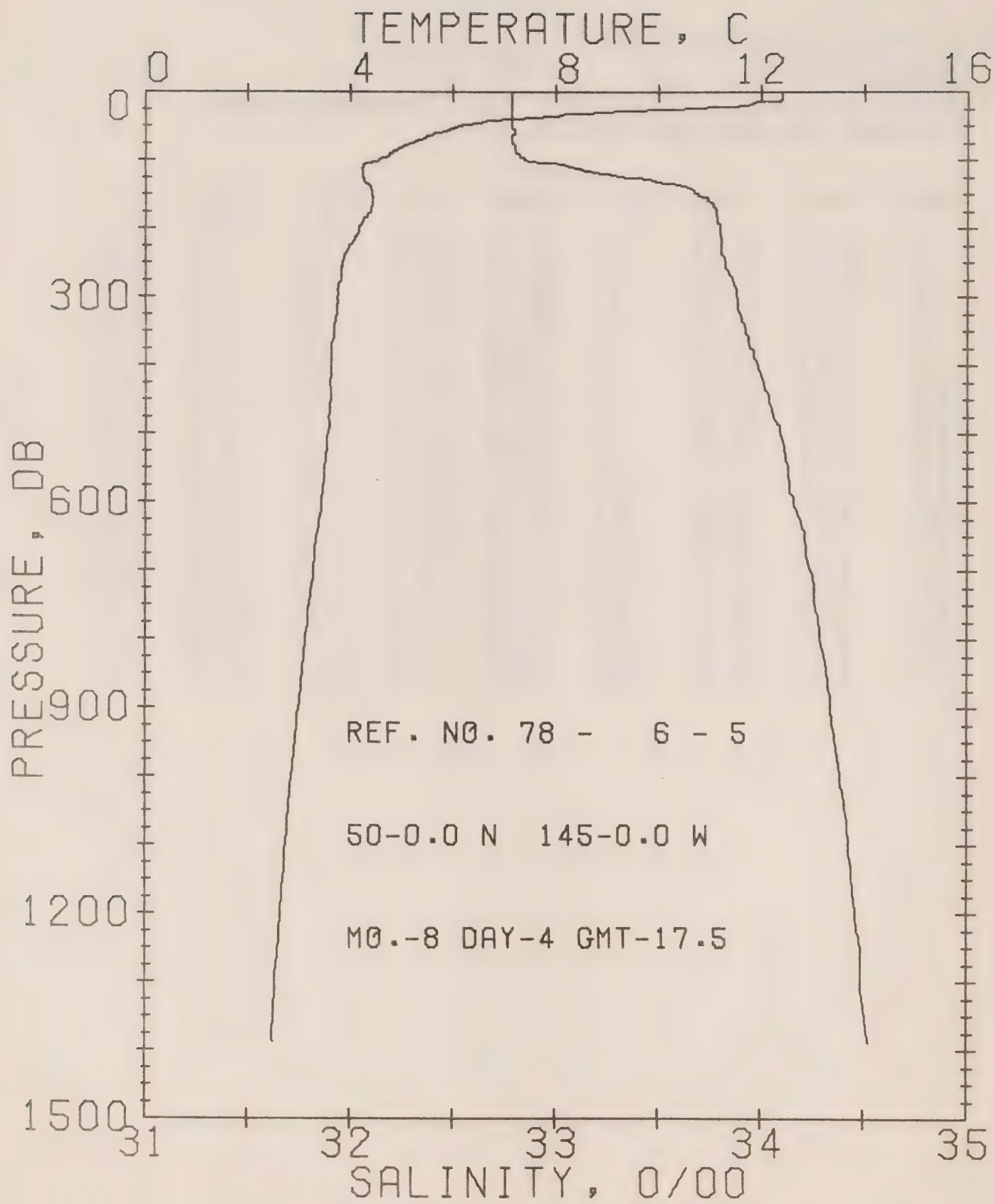
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 4 DATE 3/ 8/78

POSITION 50- .0N, 145- .0W GMT 23.3

RESULTS OF STP CAST 316 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.64	32.73	0	24.73	322.5	.00	.00	1497.
10	12.60	32.72	10	24.73	322.7	.32	.02	1497.
20	12.04	32.72	20	24.84	312.8	.64	.06	1495.
30	7.36	32.76	30	25.63	237.1	.91	.13	1478.
50	5.87	32.76	50	25.82	218.8	1.36	.32	1472.
75	5.17	32.77	75	25.91	210.4	1.89	.66	1470.
100	4.67	32.78	99	25.98	204.6	2.41	1.12	1468.
125	4.25	33.14	124	26.31	173.5	2.89	1.66	1467.
150	4.38	33.59	149	26.65	141.2	3.28	2.21	1469.
175	4.37	33.76	174	26.79	128.6	3.61	2.76	1470.
200	4.11	33.80	199	26.84	123.2	3.92	3.36	1469.
225	3.97	33.81	223	26.87	121.2	4.23	4.02	1469.
250	3.86	33.83	248	26.89	118.8	4.53	4.74	1469.
300	3.77	33.89	298	26.95	113.8	5.11	6.37	1469.
400	3.62	33.99	397	27.05	105.1	6.21	10.28	1470.
500	3.56	34.10	496	27.14	97.1	7.22	14.91	1472.
600	3.39	34.20	595	27.23	89.0	8.15	20.13	1473.
800	3.11	34.30	793	27.34	79.7	9.84	32.13	1475.
1000	2.84	34.40	990	27.44	71.0	11.34	45.88	1478.
1200	2.60	34.47	1188	27.52	64.2	12.69	60.98	1480.



## OFFSHORE OCEANOGRAPHY GROUP

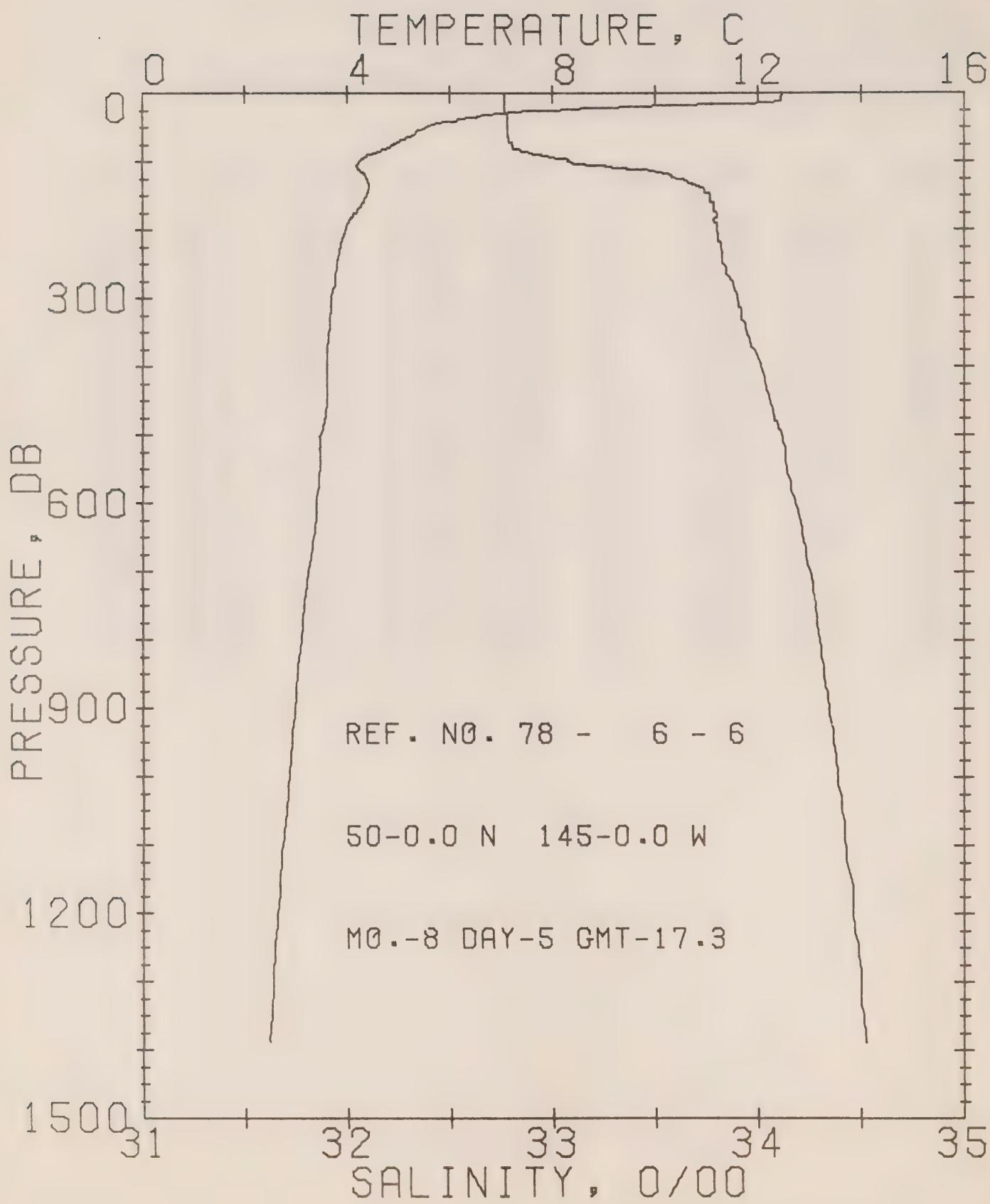
REFERENCE NO. 78- 6- 5 DATE 4/ 8/78

POSITION 50- .0N, 145- .0W GMT 17.5

RESULTS OF STP CAST 304 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.39	32.79	0	24.82	313.5	.00	.00	1496.
10	12.40	32.79	10	24.82	313.9	.31	.02	1496.
20	11.72	32.79	20	24.95	302.0	.62	.06	1494.
30	9.02	32.79	30	25.41	258.2	.90	.13	1484.
50	6.15	32.79	50	25.81	219.9	1.37	.32	1474.
75	5.15	32.79	75	25.93	208.7	1.90	.66	1470.
100	4.50	32.86	99	26.06	196.8	2.41	1.12	1468.
125	4.25	33.36	124	26.48	156.9	2.85	1.62	1468.
150	4.43	33.69	149	26.72	134.3	3.21	2.12	1469.
175	4.39	33.78	174	26.80	127.3	3.53	2.65	1470.
200	4.16	33.80	199	26.84	123.7	3.84	3.25	1469.
225	3.98	33.81	223	26.87	121.3	4.15	3.92	1469.
250	3.84	33.83	248	26.90	118.5	4.45	4.64	1469.
300	3.76	33.88	298	26.95	114.0	5.03	6.27	1469.
400	3.64	33.99	397	27.04	106.0	6.14	10.20	1470.
500	3.57	34.09	496	27.13	98.1	7.16	14.88	1472.
600	3.45	34.16	595	27.20	92.5	8.11	20.21	1473.
800	3.12	34.29	793	27.33	80.8	9.82	32.41	1475.
1000	2.85	34.39	990	27.43	71.8	11.35	46.35	1478.
1200	2.64	34.46	1188	27.51	65.3	12.71	61.66	1480.



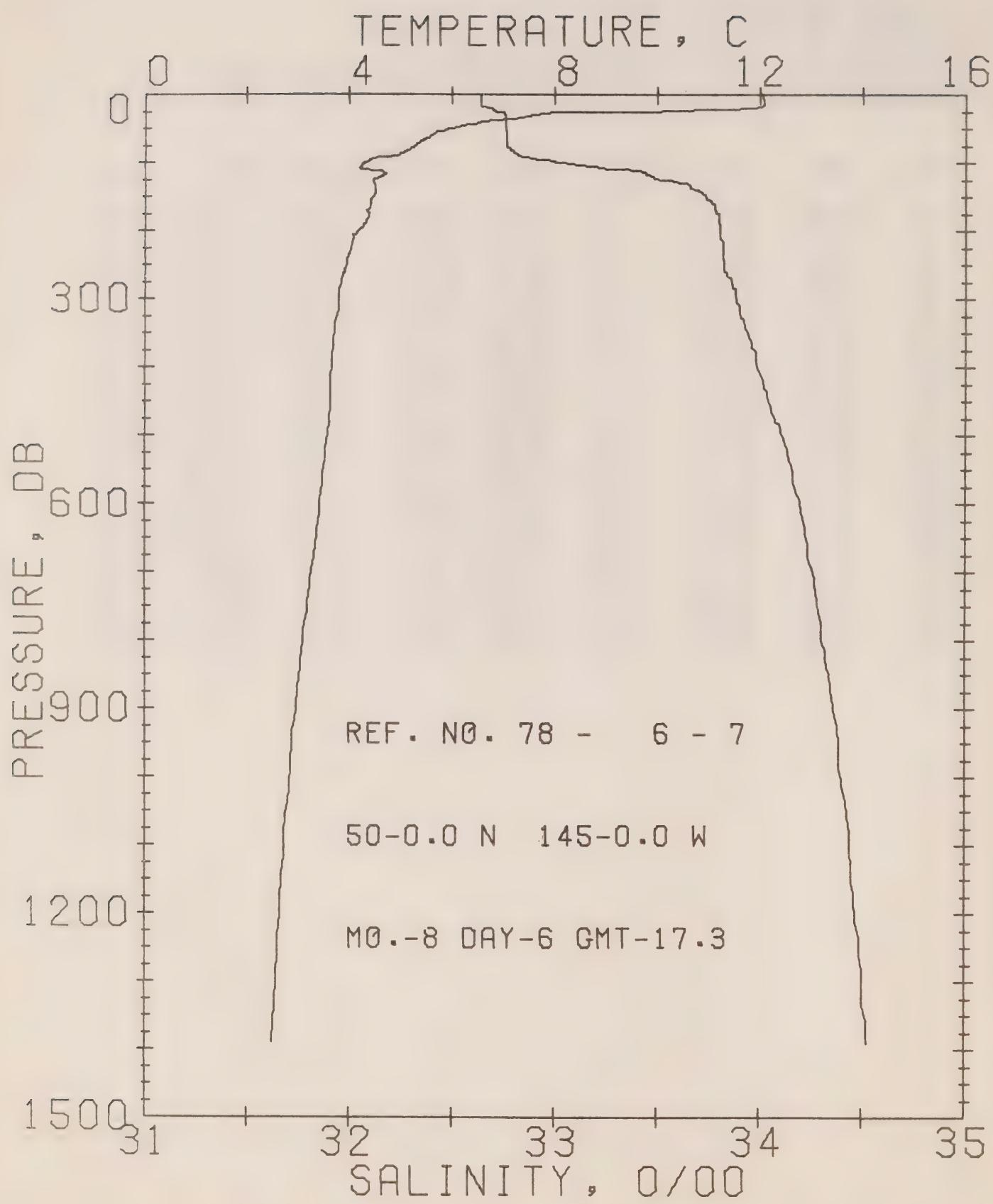
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 6 DATE 5/ 8/78

POSITION 50- .0N, 145- .0W GMT 17.3

RESULTS OF STP CAST 302 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.46	32.77	0	24.79	316.2	.00	.00	1496.
10	12.45	32.77	10	24.80	316.3	.32	.02	1496.
20	9.60	32.77	20	25.30	268.4	.62	.06	1486.
30	6.98	32.77	30	25.69	231.4	.86	.12	1477.
50	5.53	32.78	50	25.88	213.4	1.30	.30	1471.
75	4.90	32.80	75	25.97	205.3	1.83	.64	1469.
100	4.21	33.07	99	26.26	178.1	2.31	1.07	1467.
125	4.38	33.61	124	26.67	139.5	2.70	1.51	1469.
150	4.36	33.77	149	26.79	127.5	3.03	1.97	1469.
175	4.16	33.80	174	26.84	123.5	3.35	2.50	1469.
200	3.97	33.80	199	26.86	121.7	3.65	3.08	1468.
225	3.87	33.82	223	26.88	119.4	3.95	3.73	1468.
250	3.79	33.83	248	26.90	118.1	4.25	4.45	1468.
300	3.68	33.90	298	26.97	112.1	4.82	6.06	1469.
400	3.61	34.01	397	27.06	103.9	5.91	9.91	1470.
500	3.46	34.11	496	27.16	95.4	6.91	14.51	1472.
600	3.39	34.18	595	27.22	90.3	7.84	19.74	1473.
800	3.09	34.30	793	27.34	79.6	9.53	31.74	1475.
1000	2.85	34.39	990	27.43	71.7	11.04	45.55	1478.
1200	2.62	34.46	1188	27.51	65.2	12.40	60.81	1480.



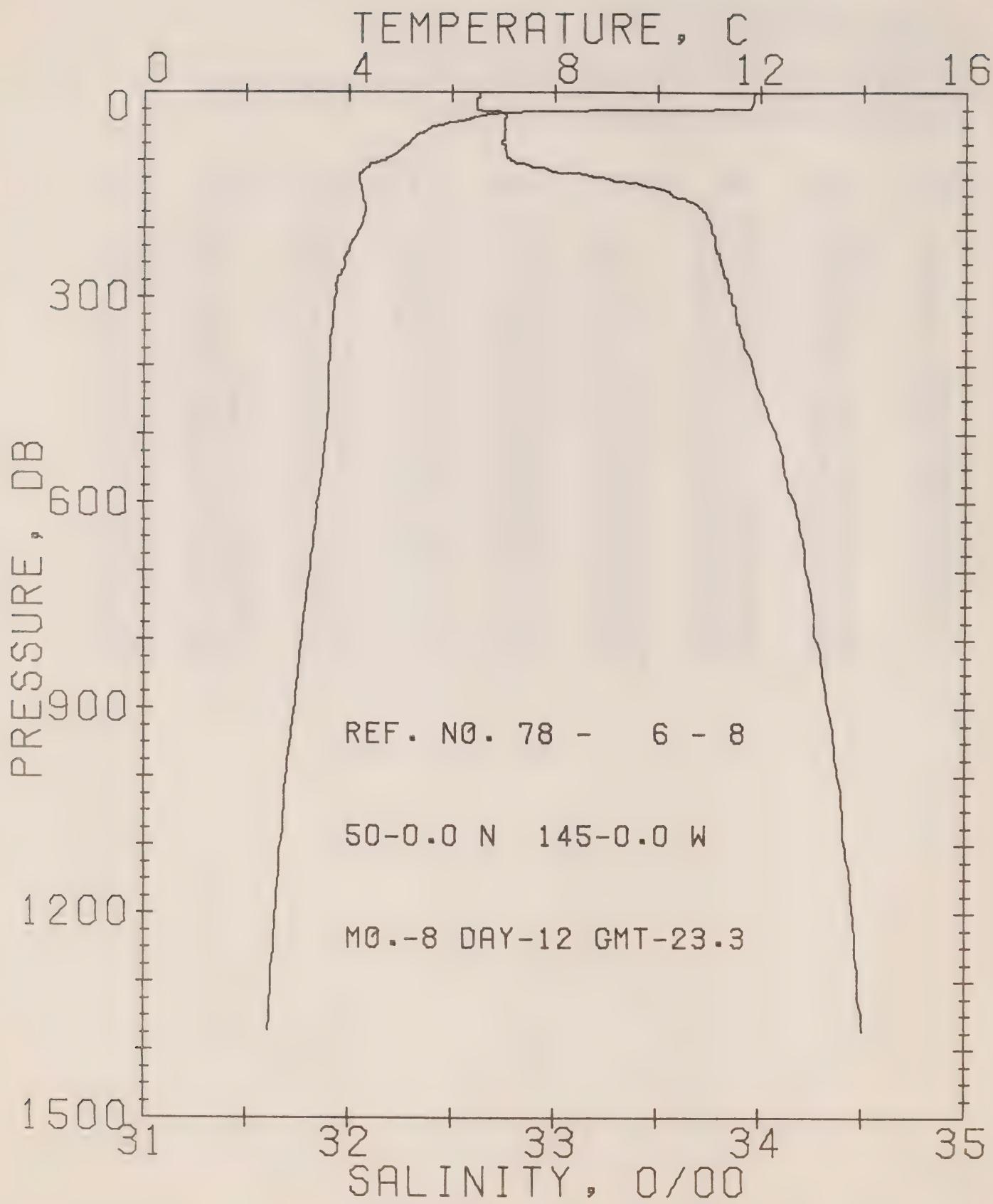
OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 7 DATE 6/ 8/78

POSITION 50- .0N, 145- .0W GMT 17.3

RESULTS OF STP CAST 312 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.05	32.64	0	24.77	318.4	.00	.00	1495.
10	12.07	32.64	10	24.77	319.0	.32	.02	1495.
20	11.86	32.68	20	24.84	312.5	.64	.06	1494.
30	7.62	32.75	30	25.59	241.3	.91	.13	1479.
50	5.99	32.76	50	25.81	220.2	1.37	.32	1473.
75	5.28	32.77	75	25.90	211.6	1.90	.66	1470.
100	4.28	33.03	99	26.22	181.8	2.41	1.11	1467.
125	4.46	33.52	124	26.59	147.1	2.81	1.57	1469.
150	4.46	33.73	149	26.75	131.6	3.15	2.05	1470.
175	4.38	33.80	174	26.82	125.8	3.47	2.58	1470.
200	4.17	33.81	199	26.85	123.0	3.79	3.18	1469.
225	4.03	33.82	223	26.87	121.0	4.09	3.83	1469.
250	3.94	33.83	248	26.89	119.6	4.39	4.56	1469.
300	3.79	33.89	298	26.95	114.0	4.97	6.20	1469.
400	3.65	33.99	397	27.04	106.1	6.07	10.11	1471.
500	3.56	34.10	496	27.14	97.1	7.09	14.78	1472.
600	3.42	34.19	595	27.22	89.9	8.03	20.00	1473.
800	3.09	34.30	793	27.34	79.7	9.71	31.98	1475.
1000	2.84	34.40	990	27.44	71.1	11.20	45.61	1477.
1200	2.63	34.47	1188	27.51	64.8	12.55	60.69	1480.



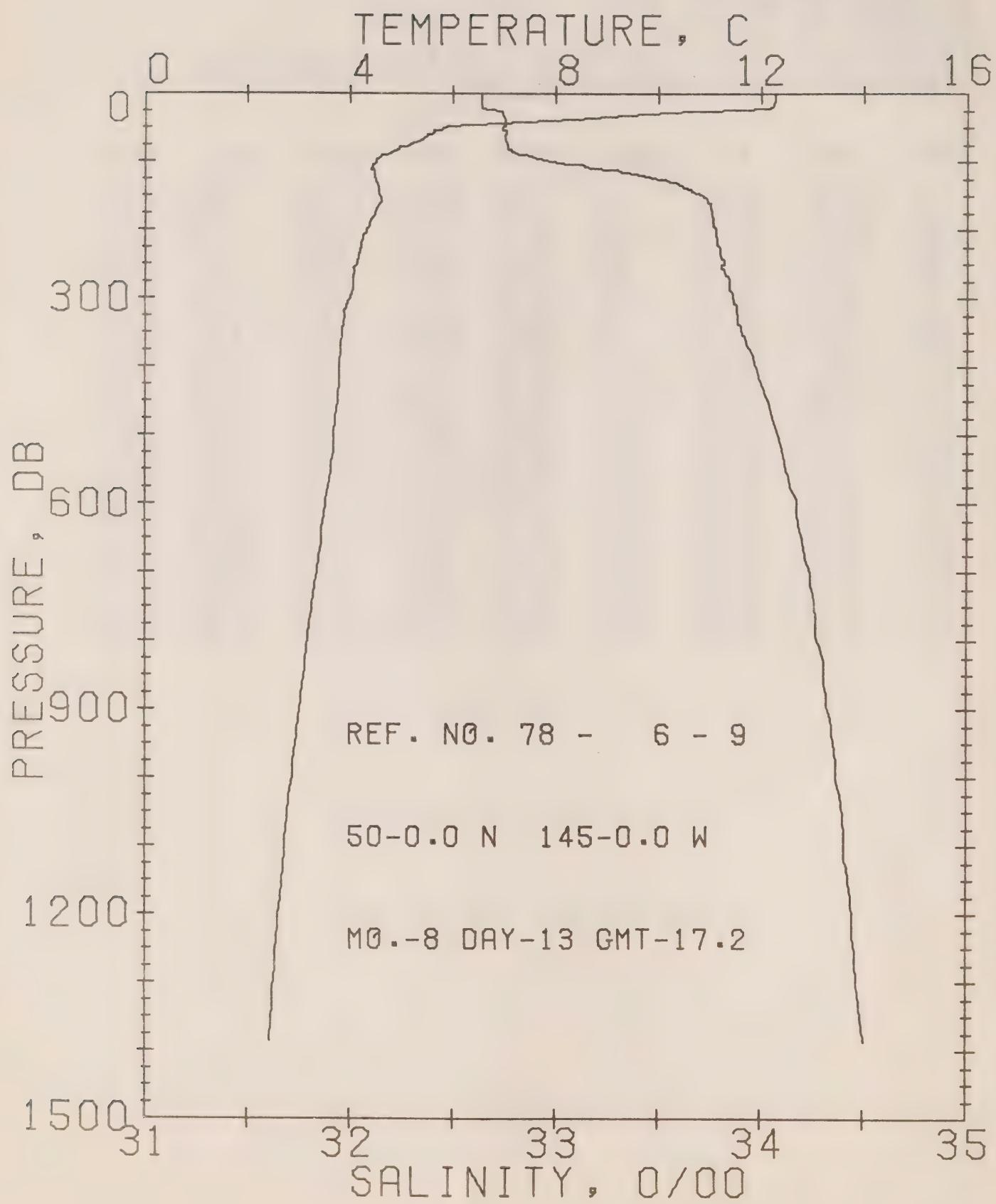
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 8 DATE 12/ 8/78

POSITION 50- .0N, 145- .0W GMT 23.3

RESULTS OF STP CAST 308 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	DELTA	POT.	SOUND
				T		D	EN	
0	11.89	32.63	0	24.79	316.3	.00	.00	1494.
10	11.86	32.62	10	24.79	316.7	.32	.02	1494.
20	11.83	32.62	20	24.80	316.4	.63	.06	1494.
30	7.13	32.74	30	25.65	235.6	.92	.14	1477.
50	5.66	32.75	50	25.84	217.1	1.37	.32	1472.
75	5.14	32.74	75	25.89	212.3	1.91	.66	1470.
100	4.62	32.79	99	25.99	203.3	2.43	1.12	1468.
125	4.19	33.23	124	26.38	166.1	2.89	1.66	1467.
150	4.26	33.57	149	26.64	141.8	3.27	2.19	1468.
175	4.30	33.72	174	26.76	130.5	3.61	2.74	1469.
200	4.20	33.76	199	26.80	127.1	3.93	3.36	1469.
225	4.01	33.78	223	26.84	123.9	4.24	4.04	1469.
250	3.91	33.81	248	26.87	120.8	4.55	4.77	1469.
300	3.72	33.86	298	26.93	115.5	5.14	6.42	1469.
400	3.61	33.96	397	27.02	107.4	6.25	10.40	1470.
500	3.56	34.08	496	27.12	98.9	7.29	15.15	1472.
600	3.37	34.17	595	27.21	91.0	8.24	20.49	1473.
800	3.08	34.28	793	27.32	81.2	9.96	32.70	1475.
1000	2.78	34.38	990	27.43	71.7	11.48	46.59	1477.
1200	2.57	34.46	1188	27.51	64.8	12.84	61.83	1480.



## OFFSHORE OCEANOGRAPHY GROUP

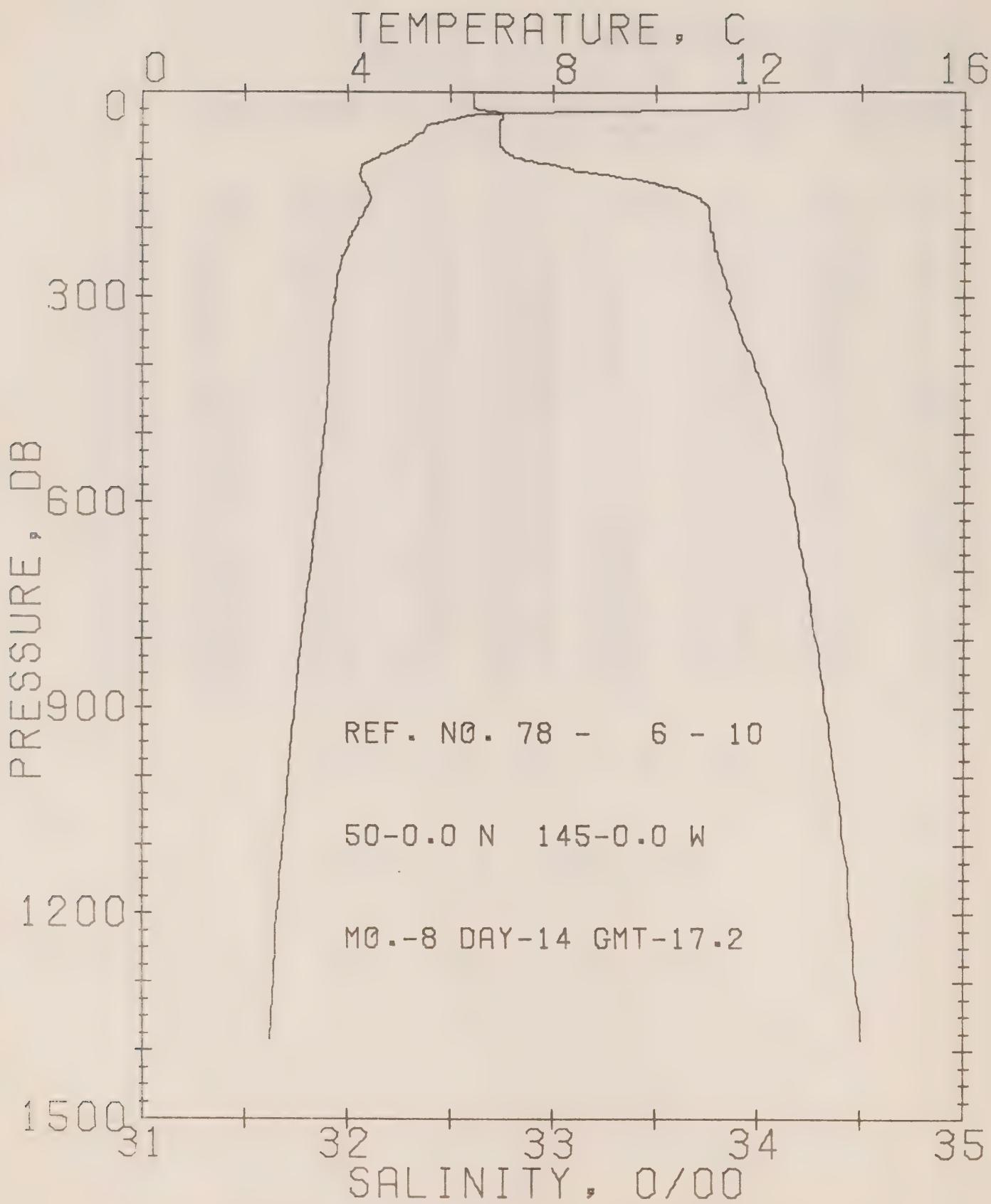
REFERENCE NO. 78- 6- 9 DATE 13/ 8/78

POSITION 50- .0N, 145- .0W GMT 17.2

RESULTS OF STP CAST 270 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.26	32.64	0	24.73	322.2	.00	.00	1495.
10	12.27	32.64	10	24.73	322.6	.32	.02	1496.
20	12.19	32.64	20	24.75	321.4	.64	.07	1495.
30	9.79	32.74	30	25.25	273.8	.94	.14	1487.
50	5.85	32.74	50	25.82	219.6	1.43	.34	1472.
75	5.17	32.76	75	25.91	210.7	1.97	.68	1470.
100	4.50	32.99	99	26.16	187.0	2.47	1.13	1468.
125	4.50	33.49	124	26.56	149.7	2.89	1.60	1469.
150	4.58	33.72	149	26.73	133.6	3.24	2.10	1470.
175	4.48	33.76	174	26.77	129.8	3.57	2.64	1470.
200	4.33	33.78	199	26.81	126.9	3.89	3.25	1470.
225	4.21	33.80	223	26.83	124.7	4.20	3.94	1470.
250	4.13	33.82	248	26.85	122.7	4.51	4.68	1470.
300	3.99	33.86	298	26.91	118.0	5.11	6.37	1470.
400	3.79	33.97	397	27.02	108.4	6.25	10.39	1471.
500	3.69	34.08	496	27.11	100.2	7.29	15.18	1472.
600	3.52	34.17	595	27.20	92.5	8.26	20.60	1474.
800	3.15	34.28	793	27.32	82.1	10.00	33.00	1475.
1000	2.86	34.37	990	27.42	73.3	11.54	47.12	1478.
1200	2.61	34.45	1188	27.50	65.9	12.93	62.64	1480.



OFFSHORE OCEANOGRAPHY GROUP

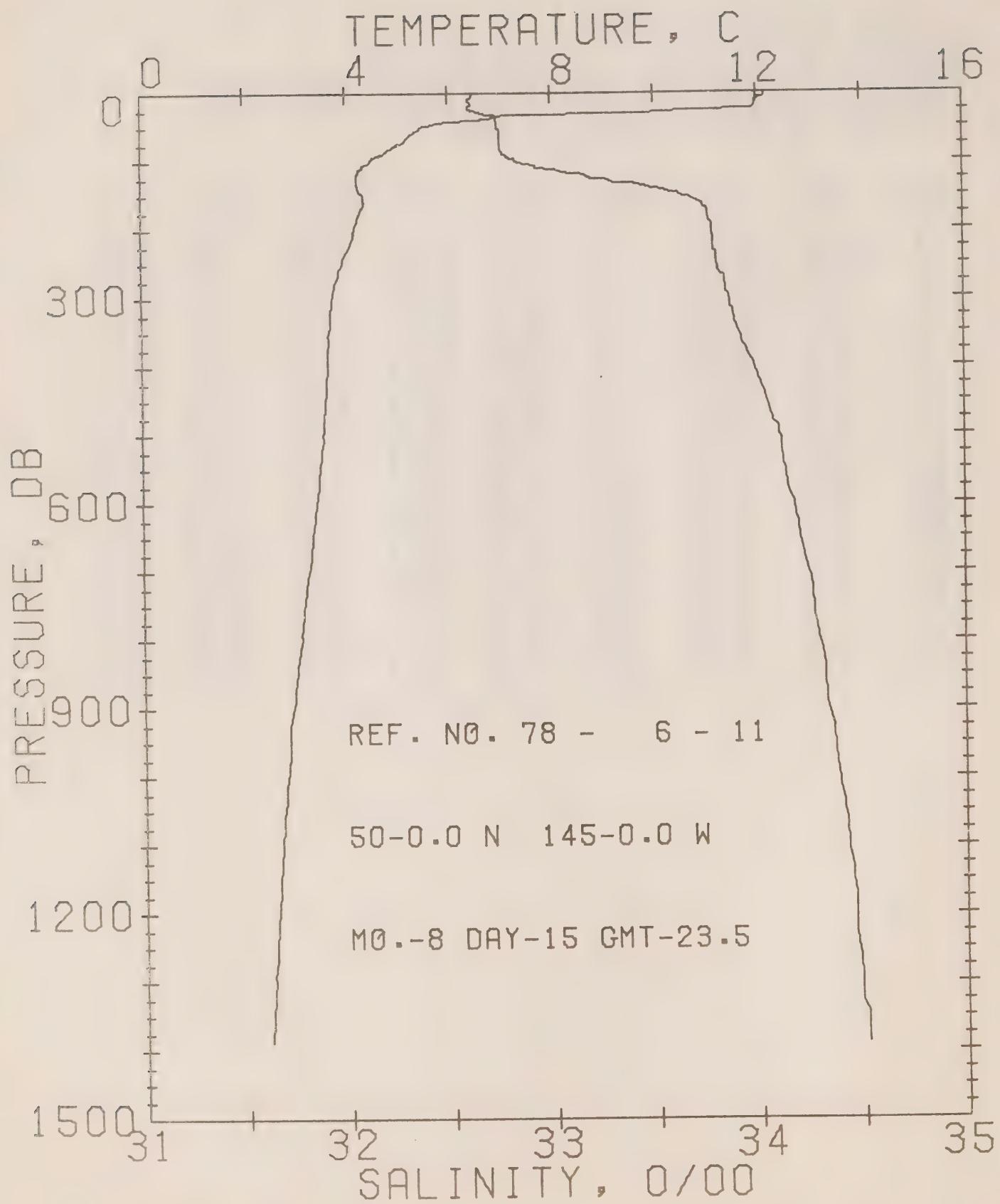
REFERENCE NO. 78- 6- 10 DATE 14/ 8/78

POSITION 50- .0N, 145- .0W GMT 17.2

RESULTS OF STP CAST 290 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.79	32.61	0	24.80	316.0	.00	.00	1494.
10	11.79	32.61	10	24.80	316.2	.32	.02	1494.
20	11.79	32.61	20	24.80	316.5	.63	.06	1494.
30	7.26	32.74	30	25.63	237.3	.93	.14	1478.
50	5.53	32.74	50	25.85	216.4	1.38	.32	1471.
75	5.12	32.74	75	25.90	212.1	1.91	.66	1470.
100	4.42	32.89	99	26.09	193.7	2.43	1.12	1467.
125	4.26	33.35	124	26.47	157.8	2.87	1.62	1468.
150	4.44	33.67	149	26.71	135.9	3.23	2.13	1469.
175	4.30	33.76	174	26.79	127.9	3.56	2.67	1469.
200	4.12	33.77	199	26.82	125.5	3.87	3.28	1469.
225	4.01	33.79	223	26.85	123.1	4.18	3.95	1469.
250	3.86	33.81	248	26.88	120.3	4.49	4.69	1469.
300	3.74	33.87	298	26.94	115.1	5.08	6.33	1469.
400	3.62	33.98	397	27.04	106.3	6.19	10.30	1470.
500	3.53	34.09	496	27.14	97.6	7.21	14.96	1472.
600	3.41	34.17	595	27.21	91.3	8.16	20.26	1473.
800	3.10	34.28	793	27.32	81.4	9.88	32.54	1475.
1000	2.85	34.38	990	27.42	72.7	11.41	46.58	1476.
1200	2.62	34.45	1188	27.50	65.9	12.79	62.00	1480.



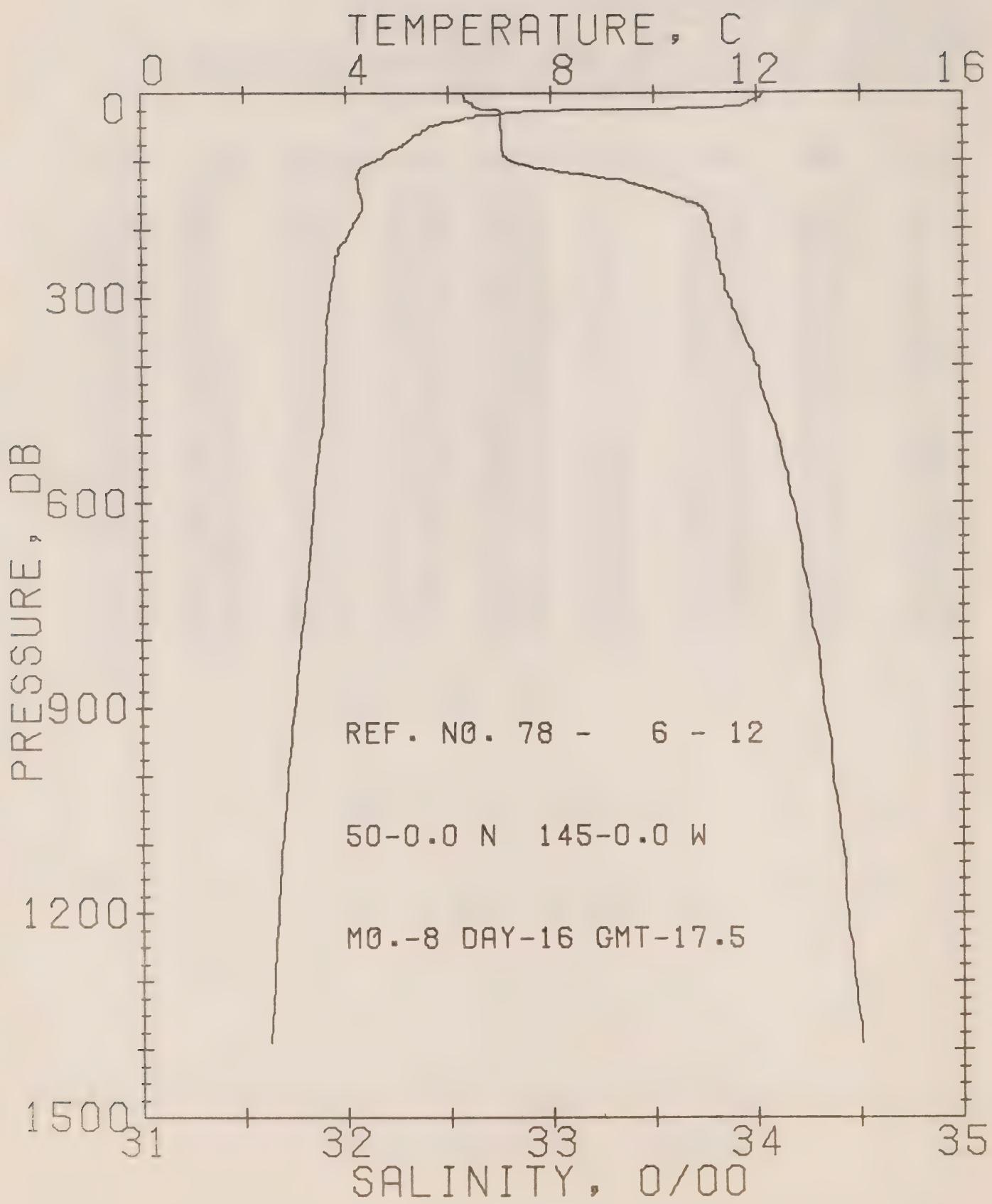
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 11 DATE 15/ 8/78

POSITION 50- .0N, 145- .0W GMT 23.5

RESULTS OF STP CAST 259 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	DELTA	POT.	SOUND
				T		D	EN	
0	12.17	32.62	0	24.73	322.0	.00	.00	1495.
10	12.02	32.60	10	24.75	321.0	.32	.02	1495.
20	11.96	32.60	20	24.76	320.2	.64	.07	1495.
30	9.72	32.66	30	25.20	278.6	.95	.14	1487.
50	5.50	32.74	50	25.85	216.0	1.41	.33	1471.
75	5.00	32.75	75	25.92	210.1	1.94	.67	1469.
100	4.48	32.83	99	26.04	198.8	2.45	1.13	1468.
125	4.22	33.19	124	26.35	169.4	2.91	1.65	1467.
150	4.35	33.63	149	26.68	137.9	3.29	2.17	1469.
175	4.26	33.76	174	26.80	127.5	3.62	2.72	1469.
200	4.15	33.78	199	26.82	125.1	3.93	3.32	1469.
225	4.06	33.79	223	26.84	123.6	4.24	3.99	1469.
250	3.92	33.80	248	26.86	121.6	4.55	4.73	1469.
300	3.73	33.86	298	26.93	115.2	5.14	6.39	1469.
400	3.63	33.98	397	27.04	106.0	6.25	10.34	1470.
500	3.53	34.10	496	27.14	97.1	7.27	15.00	1472.
600	3.38	34.17	595	27.21	91.1	8.21	20.30	1473.
800	3.07	34.29	793	27.34	79.9	9.92	32.44	1475.
1000	2.79	34.39	990	27.44	71.3	11.42	46.21	1477.
1200	2.58	34.46	1188	27.51	64.8	12.77	61.29	1480.



## OFFSHORE OCEANOGRAPHY GROUP

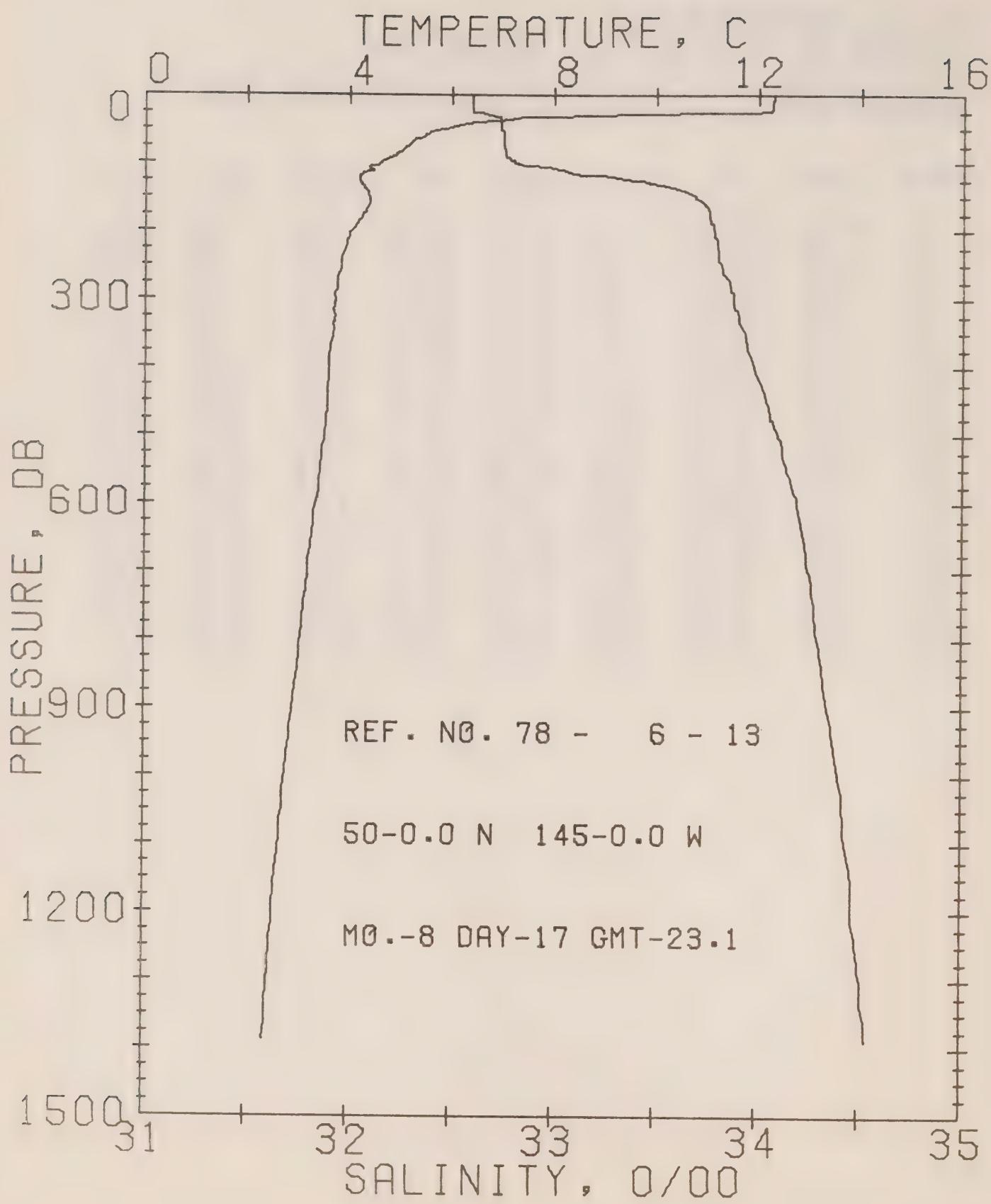
REFERENCE NO. 78- 6- 12

DATE 16/ 8/78

POSITION 50- .0N, 145- .0W GMT 17.5

RESULTS OF STP CAST 295 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.12	32.57	0	24.70	324.8	.00	.00	1495.
10	11.96	32.58	10	24.74	321.4	.32	.02	1494.
20	11.70	32.62	20	24.82	314.1	.64	.06	1494.
30	7.04	32.75	30	25.67	233.7	.90	.13	1477.
50	5.62	32.75	50	25.85	216.6	1.35	.31	1471.
75	5.12	32.76	75	25.91	210.6	1.88	.65	1470.
100	4.52	32.81	99	26.02	200.8	2.40	1.11	1468.
125	4.21	33.28	124	26.42	162.5	2.86	1.64	1467.
150	4.30	33.58	149	26.65	141.2	3.23	2.16	1469.
175	4.27	33.75	174	26.79	128.3	3.57	2.71	1469.
200	4.08	33.78	199	26.83	124.3	3.88	3.32	1469.
225	3.87	33.81	223	26.88	120.2	4.19	3.98	1468.
250	3.78	33.82	248	26.89	118.7	4.49	4.70	1468.
300	3.69	33.86	298	26.93	115.2	5.07	6.34	1469.
400	3.58	34.00	397	27.06	104.4	6.16	10.23	1470.
500	3.51	34.10	496	27.14	97.0	7.17	14.86	1472.
600	3.35	34.18	595	27.22	90.0	8.11	20.10	1473.
800	3.09	34.29	793	27.33	80.6	9.82	32.30	1475.
1000	2.83	34.37	990	27.42	73.0	11.36	46.33	1477.
1200	2.64	34.44	1188	27.49	66.9	12.74	61.87	1480.



## OFFSHORE OCEANOGRAPHY GROUP

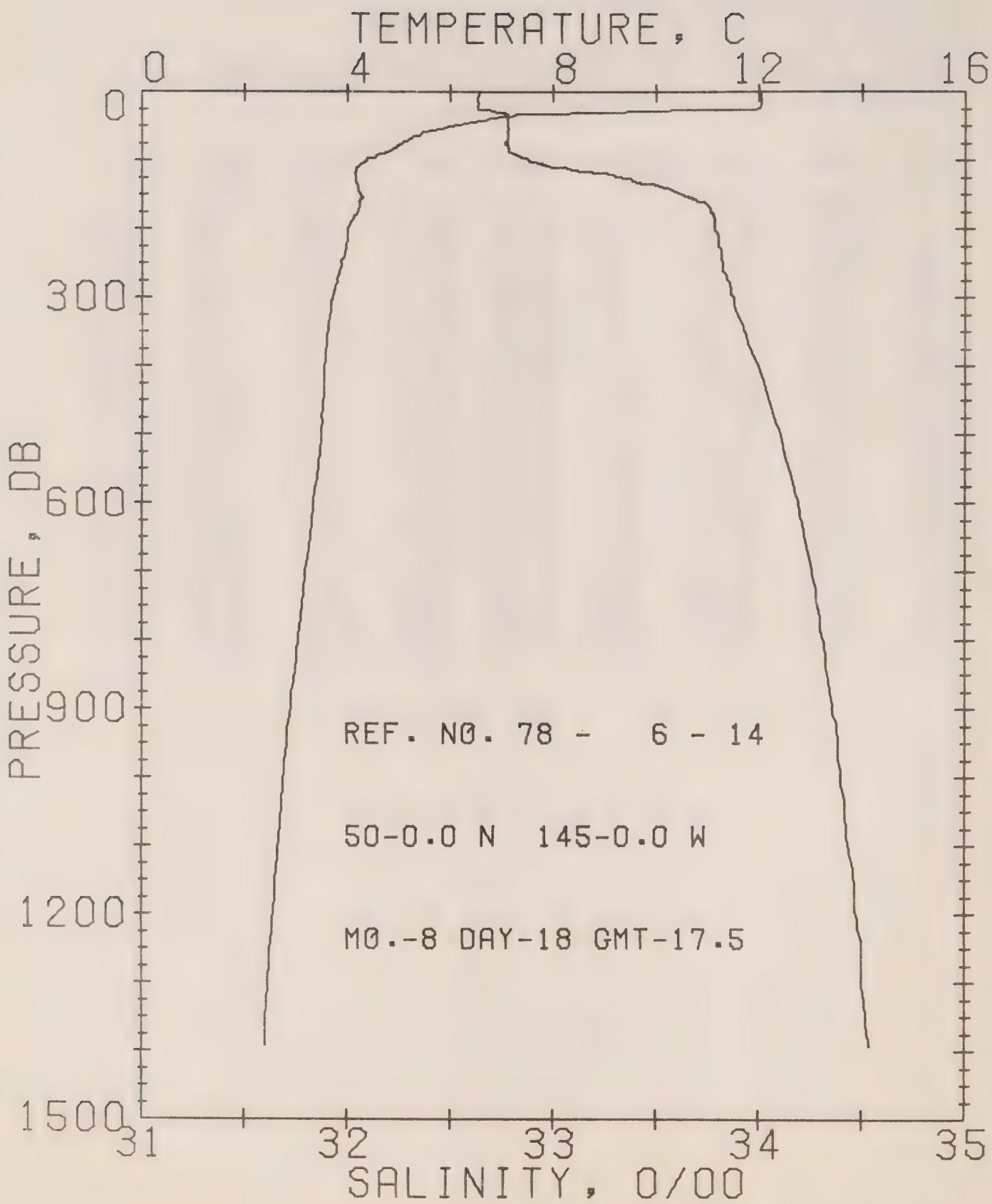
REFERENCE NO. 78- 6- 13

DATE 17/ 8/78

POSITION 50- .0N, 145- .0W GMT 23.1

RESULTS OF STP CAST 299 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.29	32.60	0	24.70	325.7	.00	.00	1495.
10	12.27	32.60	10	24.70	325.5	.33	.02	1496.
20	12.26	32.60	20	24.70	325.6	.65	.07	1496.
30	8.83	32.68	30	25.35	263.6	.96	.14	1484.
50	5.87	32.74	50	25.81	220.3	1.42	.33	1472.
75	5.12	32.75	75	25.90	211.4	1.96	.67	1470.
100	4.58	32.82	99	26.02	200.6	2.48	1.13	1468.
125	4.20	33.39	124	26.51	154.2	2.92	1.65	1468.
150	4.39	33.69	149	26.73	133.9	3.28	2.14	1469.
175	4.28	33.76	174	26.79	127.7	3.60	2.68	1469.
200	4.03	33.79	199	26.84	123.4	3.92	3.28	1469.
225	3.91	33.80	223	26.87	121.3	4.22	3.94	1469.
250	3.83	33.82	248	26.89	119.2	4.52	4.67	1469.
300	3.73	33.88	298	26.95	114.1	5.10	6.29	1469.
400	3.60	33.98	397	27.04	105.9	6.20	10.21	1470.
500	3.53	34.10	496	27.14	97.1	7.22	14.86	1472.
600	3.35	34.19	595	27.23	89.3	8.15	20.08	1473.
800	3.06	34.30	793	27.34	79.4	9.83	32.01	1475.
1000	2.77	34.40	990	27.45	70.0	11.32	45.68	1477.
1200	2.53	34.47	1188	27.53	63.4	12.64	60.50	1480.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 14 DATE 18/ 8/78

POSITION 50- .0N, 145- .0W GMT 17.5

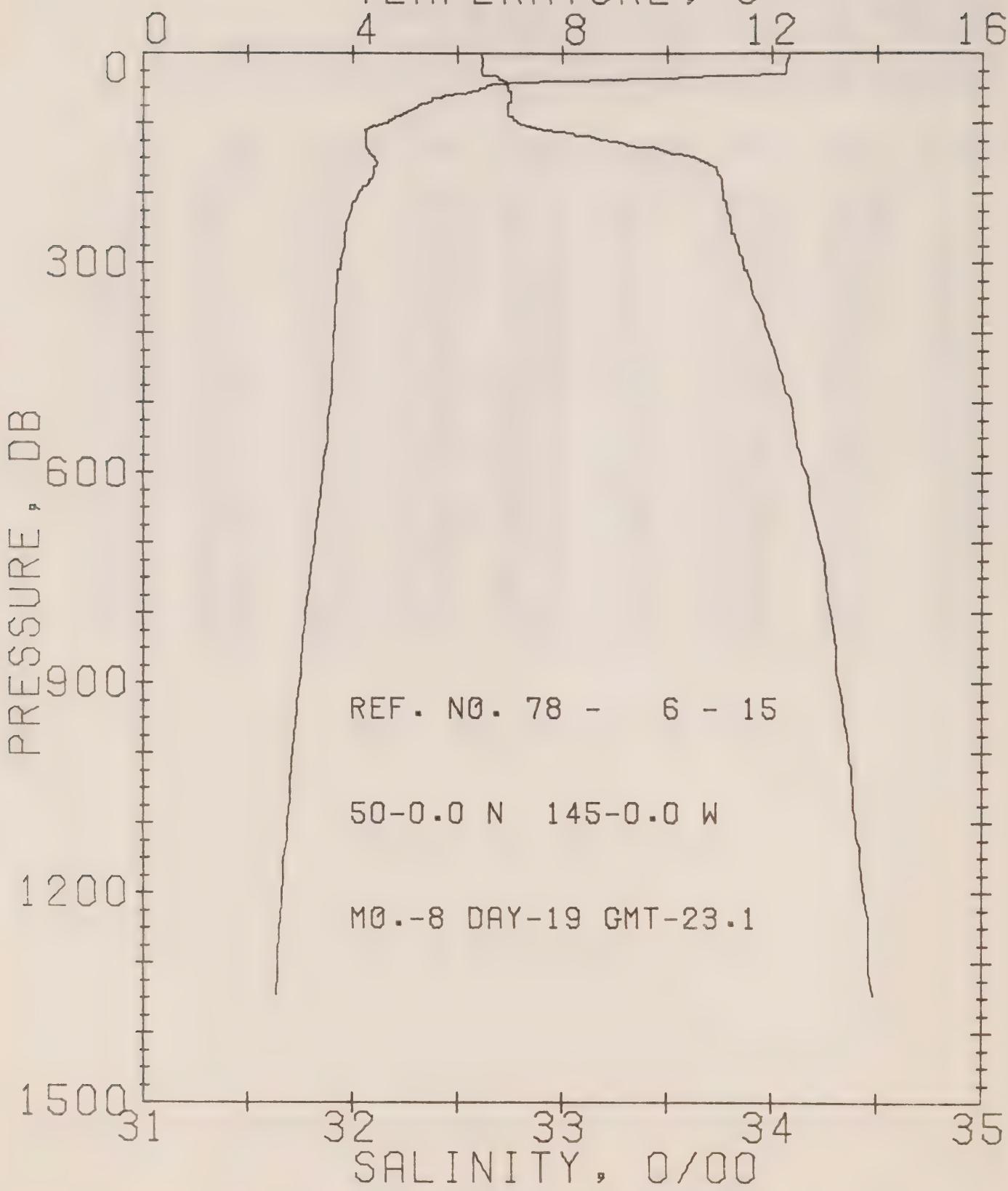
RESULTS OF STP CAST 293 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.04	32.64	0	24.77	318.2	.00	.00	1495.
10	12.05	32.63	10	24.76	319.4	.32	.02	1495.
20	12.04	32.63	20	24.77	319.3	.64	.07	1495.
30	9.17	32.72	30	25.33	265.7	.94	.14	1485.
50	6.04	32.78	50	25.82	219.3	1.40	.33	1473.
75	5.03	32.77	75	25.93	208.9	1.93	.67	1469.
100	4.35	32.89	99	26.10	193.0	2.44	1.12	1467.
125	4.16	33.36	124	26.49	156.0	2.88	1.62	1467.
150	4.28	33.63	149	26.69	137.2	3.25	2.13	1469.
175	4.20	33.77	174	26.81	126.1	3.57	2.67	1469.
200	4.01	33.79	199	26.85	122.9	3.88	3.26	1469.
225	3.98	33.81	223	26.87	121.3	4.18	3.92	1469.
250	3.90	33.83	248	26.89	119.1	4.49	4.65	1469.
300	3.71	33.88	298	26.95	113.9	5.07	6.28	1469.
400	3.55	34.00	397	27.06	104.1	6.16	10.18	1470.
500	3.50	34.10	496	27.15	96.5	7.17	14.78	1472.
600	3.34	34.19	595	27.23	89.1	8.10	19.98	1473.
800	3.03	34.32	793	27.36	77.9	9.77	31.84	1475.
1000	2.77	34.40	990	27.45	70.1	11.24	45.32	1477.
1200	2.55	34.47	1188	27.53	63.3	12.57	60.20	1480.

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TEMPERATURE, C



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 15

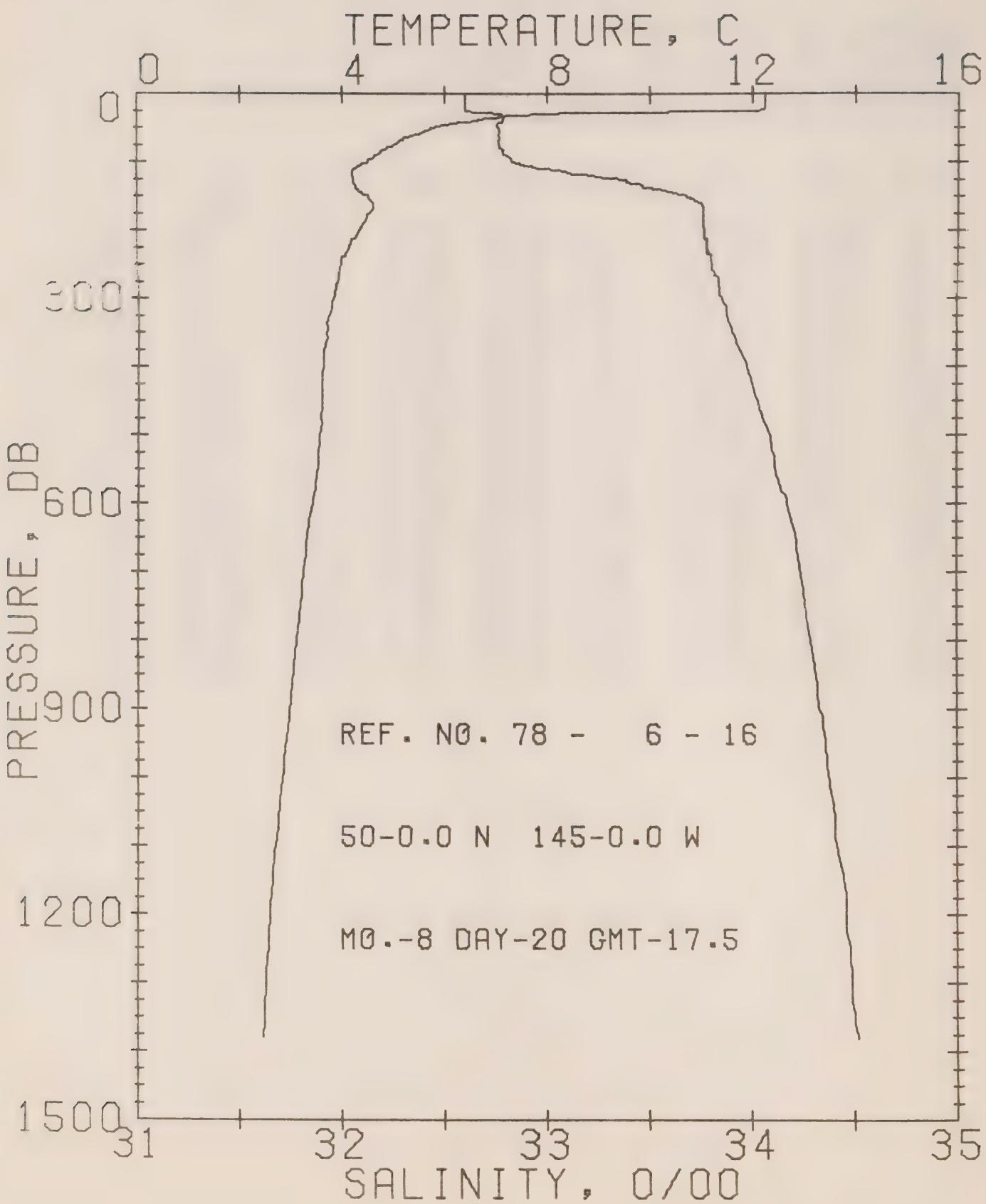
DATE 19/ 8/78

POSITION 50- .0N, 145- .0W GMT 23.1

RESULTS OF STP CAST 274 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.32	32.61	0	24.70	325.5	.00	.00	1496.
10	12.30	32.62	10	24.71	324.6	.33	.02	1496.
20	12.26	32.62	20	24.71	324.3	.65	.07	1496.
30	12.25	32.61	30	24.71	324.9	.97	.15	1496.
50	6.51	32.74	50	25.73	228.0	1.49	.36	1475.
75	5.25	32.74	75	25.88	213.5	2.04	.70	1470.
100	4.58	32.79	99	26.00	202.9	2.56	1.17	1468.
125	4.24	33.21	124	26.37	167.7	3.03	1.70	1468.
150	4.43	33.63	149	26.68	138.8	3.40	2.23	1469.
175	4.36	33.75	174	26.78	129.6	3.74	2.78	1470.
200	4.10	33.77	199	26.82	125.3	4.06	3.39	1469.
225	3.97	33.79	223	26.85	122.6	4.37	4.06	1469.
250	3.87	33.81	248	26.88	120.4	4.67	4.79	1469.
300	3.78	33.86	298	26.93	116.1	5.26	6.45	1469.
400	3.64	33.98	397	27.04	106.2	6.37	10.39	1471.
500	3.56	34.09	496	27.13	98.1	7.39	15.09	1472.
600	3.43	34.16	595	27.20	92.2	8.35	20.46	1473.
800	3.10	34.28	793	27.33	81.2	10.08	32.76	1475.
1000	2.85	34.37	990	27.42	73.2	11.62	46.90	1478.
1200	2.64	34.44	1188	27.49	67.1	13.03	62.64	1480.



OFFSHORE OCEANOGRAPHY GROUP

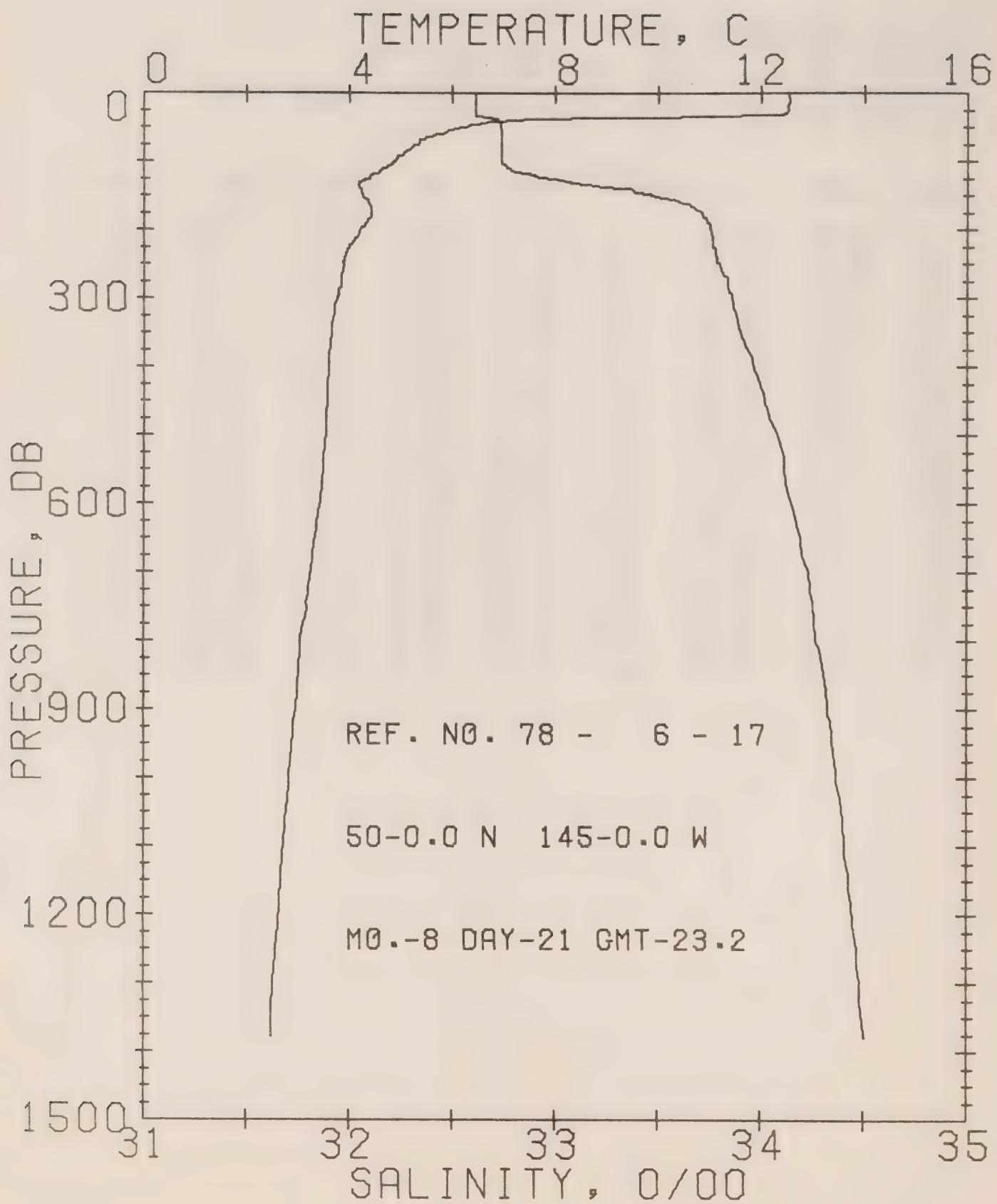
REFERENCE NO. 78- 6- 16 DATE 20/ 8/78

POSITION 50- .0N, 145- .0W GMT 17.5

RESULTS OF STP CAST 278 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.24	32.60	0	24.71	324.8	.00	.00	1495.
10	12.25	32.60	10	24.70	325.2	.32	.02	1495.
20	12.24	32.60	20	24.71	325.2	.65	.07	1496.
30	7.96	32.76	30	25.55	245.2	.96	.14	1480.
50	5.79	32.76	50	25.83	218.2	1.41	.33	1472.
75	4.98	32.77	75	25.94	208.4	1.94	.67	1469.
100	4.48	32.83	99	26.04	198.8	2.45	1.12	1468.
125	4.21	33.36	124	26.49	156.5	2.90	1.64	1468.
150	4.52	33.68	149	26.71	136.0	3.27	2.15	1470.
175	4.51	33.76	174	26.77	130.1	3.60	2.70	1470.
200	4.32	33.77	199	26.80	127.6	3.93	3.32	1470.
225	4.12	33.78	223	26.83	125.0	4.24	4.00	1469.
250	3.98	33.81	248	26.87	121.5	4.55	4.74	1469.
300	3.81	33.86	298	26.92	116.5	5.14	6.41	1469.
400	3.62	33.98	397	27.04	106.3	6.26	10.38	1470.
500	3.56	34.09	496	27.13	98.2	7.28	15.07	1472.
600	3.40	34.17	595	27.21	91.2	8.24	20.42	1473.
800	3.10	34.29	793	27.33	80.5	9.95	32.58	1475.
1000	2.83	34.38	990	27.43	72.5	11.47	46.55	1477.
1200	2.59	34.46	1188	27.51	64.8	12.84	61.82	1480.



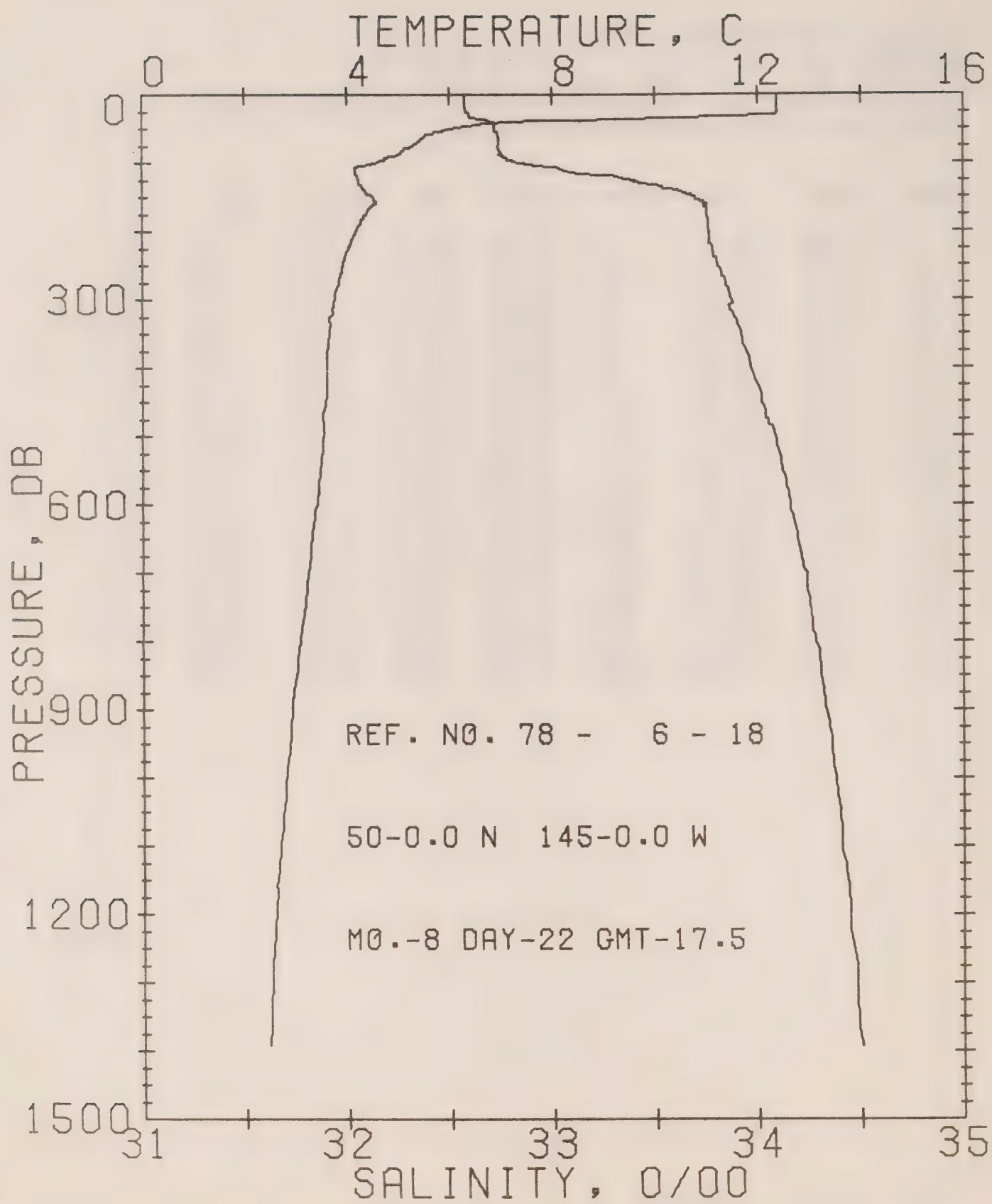
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 17 DATE 21/ 8/78

POSITION 50- .0N, 145- .0W GMT 23.2

RESULTS OF STP CAST 266 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.53	32.61	0	24.66	329.3	.00	.00	1496.
10	12.55	32.61	10	24.65	329.9	.33	.02	1497.
20	12.52	32.61	20	24.66	329.6	.66	.07	1497.
30	12.49	32.61	30	24.67	329.2	.99	.15	1497.
50	6.24	32.73	50	25.76	225.4	1.50	.36	1474.
75	5.33	32.74	75	25.87	214.4	2.05	.70	1471.
100	4.85	32.74	99	25.93	209.4	2.58	1.17	1469.
125	4.41	32.97	124	26.16	187.8	3.08	1.75	1468.
150	4.27	33.47	149	26.57	149.1	3.50	2.33	1468.
175	4.43	33.71	174	26.74	133.0	3.84	2.91	1470.
200	4.20	33.76	199	26.80	127.5	4.17	3.53	1469.
225	3.99	33.77	223	26.83	124.4	4.48	4.21	1469.
250	3.90	33.80	248	26.87	121.4	4.79	4.95	1469.
300	3.75	33.86	298	26.93	115.8	5.38	6.61	1469.
400	3.60	33.97	397	27.03	107.1	6.50	10.59	1470.
500	3.54	34.08	496	27.12	98.9	7.53	15.31	1472.
600	3.42	34.15	595	27.19	93.2	8.49	20.69	1473.
800	3.05	34.27	793	27.32	81.5	10.22	33.02	1475.
1000	2.83	34.37	990	27.42	73.0	11.76	47.05	1477.
1200	2.62	34.45	1188	27.50	66.2	13.14	62.58	1480.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 18

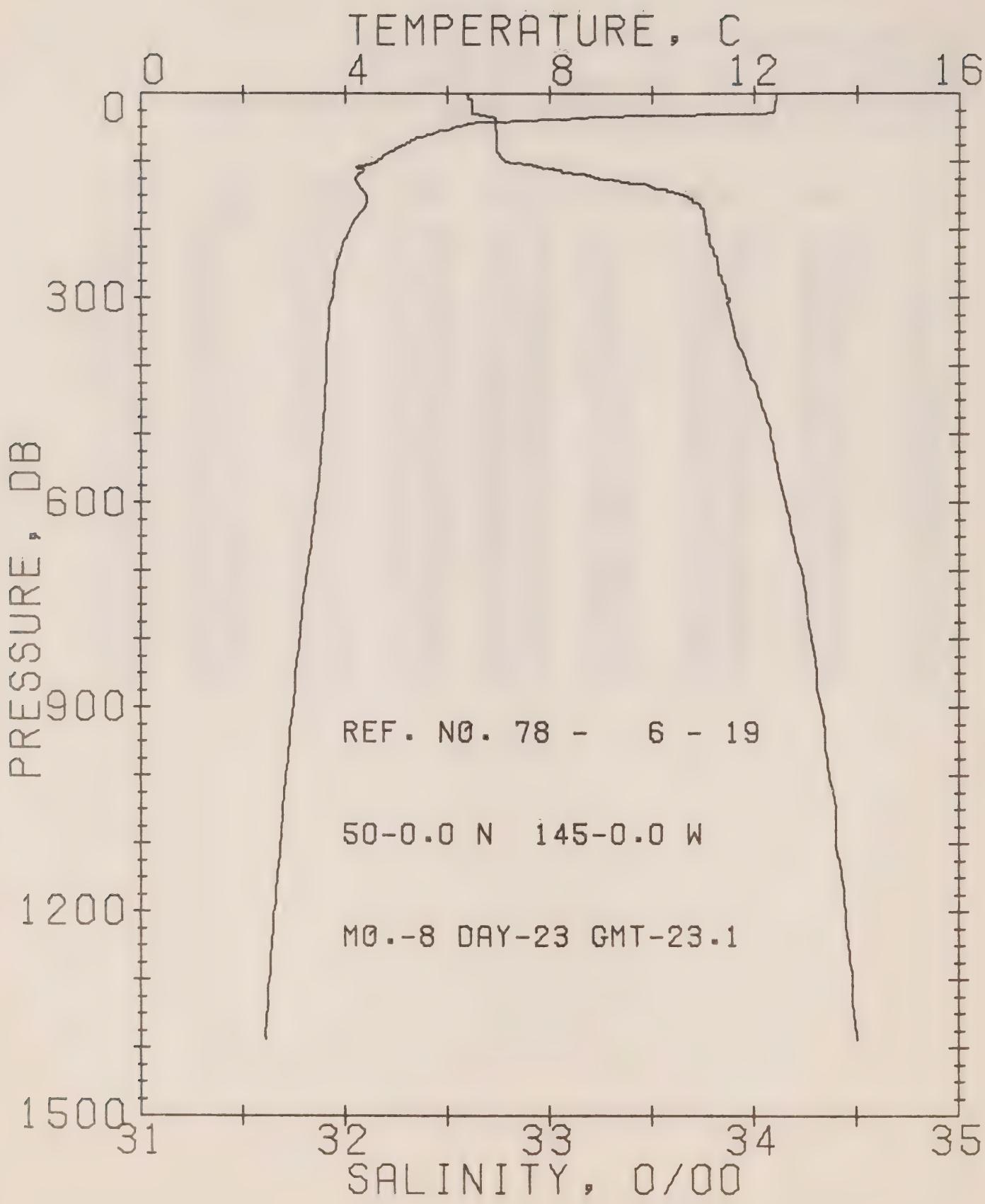
DATE 22/ 8/78

POSITION 50- .0N, 145- .0W GMT 17.5

RESULTS OF STP CAST 312 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED. PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA. D	POT. EN	SOUND
0	12.37	32.57	0	24.66	329.3	.00	.00	1496.
10	12.38	32.57	10	24.66	329.7	.33	.02	1496.
20	12.38	32.58	20	24.66	329.5	.66	.07	1496.
30	12.33	32.59	30	24.68	327.8	.99	.15	1496.
50	6.03	32.72	50	25.77	223.7	1.50	.36	1473.
75	5.25	32.73	75	25.87	214.3	2.04	.70	1470.
100	4.49	32.86	99	26.06	196.7	2.56	1.16	1468.
125	4.23	33.38	124	26.50	155.2	3.00	1.67	1468.
150	4.53	33.69	149	26.71	135.3	3.36	2.17	1470.
175	4.36	33.75	174	26.78	129.3	3.69	2.71	1470.
200	4.17	33.76	199	26.81	126.4	4.01	3.32	1469.
225	4.02	33.78	223	26.84	123.9	4.32	4.00	1469.
250	3.91	33.81	248	26.87	120.8	4.63	4.74	1469.
300	3.75	33.87	298	26.94	114.8	5.21	6.38	1469.
400	3.60	33.97	397	27.03	106.8	6.32	10.33	1470.
500	3.53	34.09	496	27.13	98.3	7.35	15.04	1472.
600	3.39	34.16	595	27.20	92.0	8.30	20.37	1473.
800	3.06	34.28	793	27.33	80.7	10.02	32.61	1475.
1000	2.79	34.38	990	27.43	71.8	11.54	46.50	1477.
1200	2.57	34.45	1188	27.51	65.4	12.91	61.82	1480.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 19

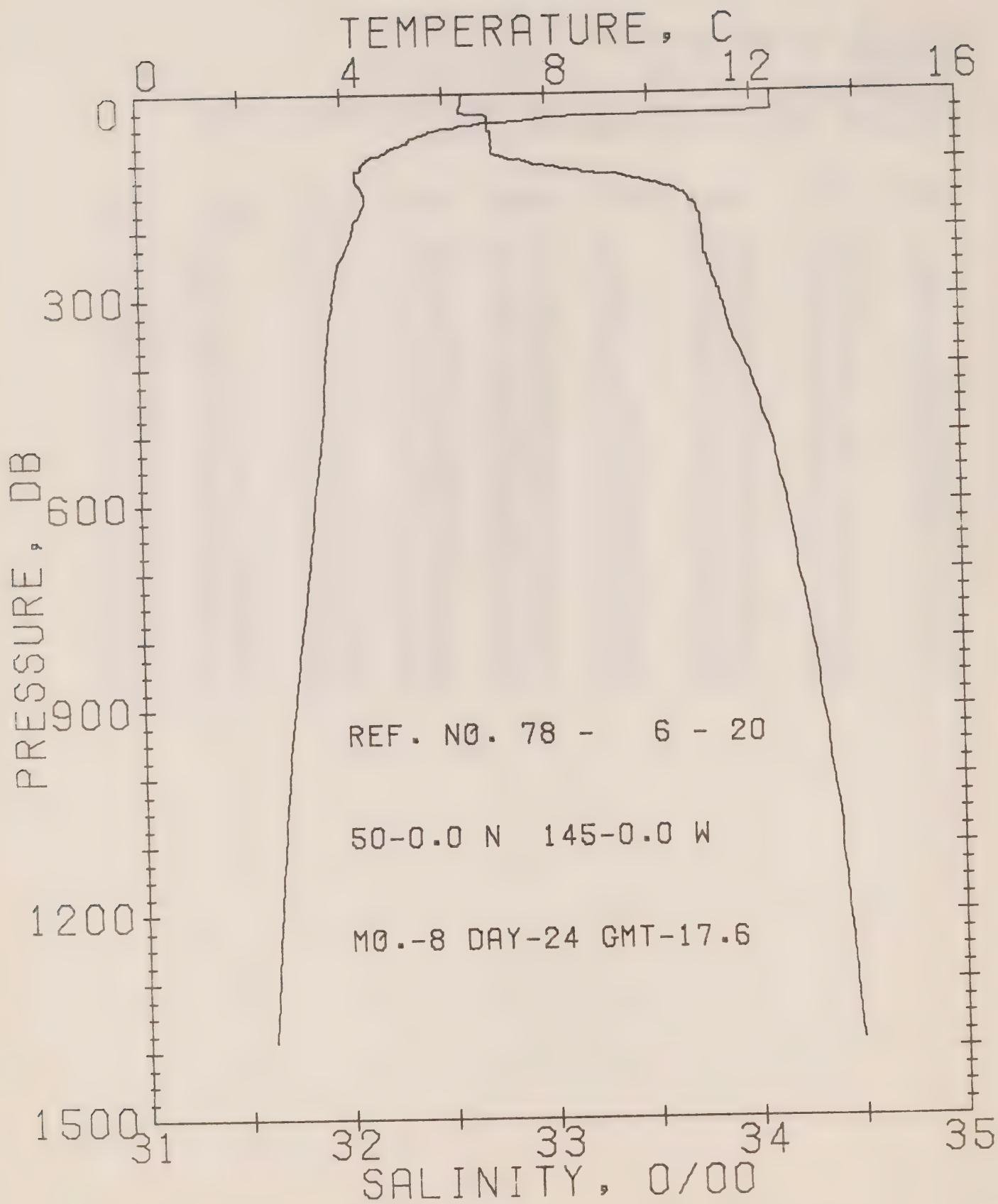
DATE 23/ 8/78

POSITION 50- .0N, 145- .0W GMT 23.1

RESULTS OF STP CAST 297 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.43	32.59	0	24.66	328.9	.00	.00	1496.
10	12.42	32.62	10	24.69	326.8	.33	.02	1496.
20	12.39	32.62	20	24.69	326.4	.65	.07	1496.
30	12.10	32.62	30	24.75	321.4	.98	.15	1495.
50	6.11	32.73	50	25.77	223.9	1.48	.35	1473.
75	5.11	32.74	75	25.90	212.0	2.02	.69	1470.
100	4.58	32.79	99	26.00	202.9	2.54	1.16	1468.
125	4.20	33.24	124	26.39	165.4	3.00	1.68	1467.
150	4.43	33.66	149	26.70	136.5	3.37	2.20	1469.
175	4.27	33.75	174	26.79	128.3	3.70	2.74	1469.
200	4.07	33.77	199	26.82	125.0	4.01	3.35	1469.
225	3.94	33.79	223	26.86	122.1	4.32	4.02	1469.
250	3.83	33.82	248	26.89	119.2	4.62	4.74	1469.
300	3.73	33.87	298	26.94	114.9	5.21	6.38	1469.
400	3.63	33.96	397	27.02	107.6	6.32	10.35	1470.
500	3.56	34.08	496	27.12	98.9	7.35	15.07	1472.
600	3.42	34.15	595	27.19	92.9	8.32	20.47	1473.
800	3.11	34.28	793	27.32	81.3	10.05	32.79	1475.
1000	2.83	34.37	990	27.42	73.0	11.59	46.88	1477.
1200	2.61	34.45	1188	27.50	65.9	12.98	62.42	1480.



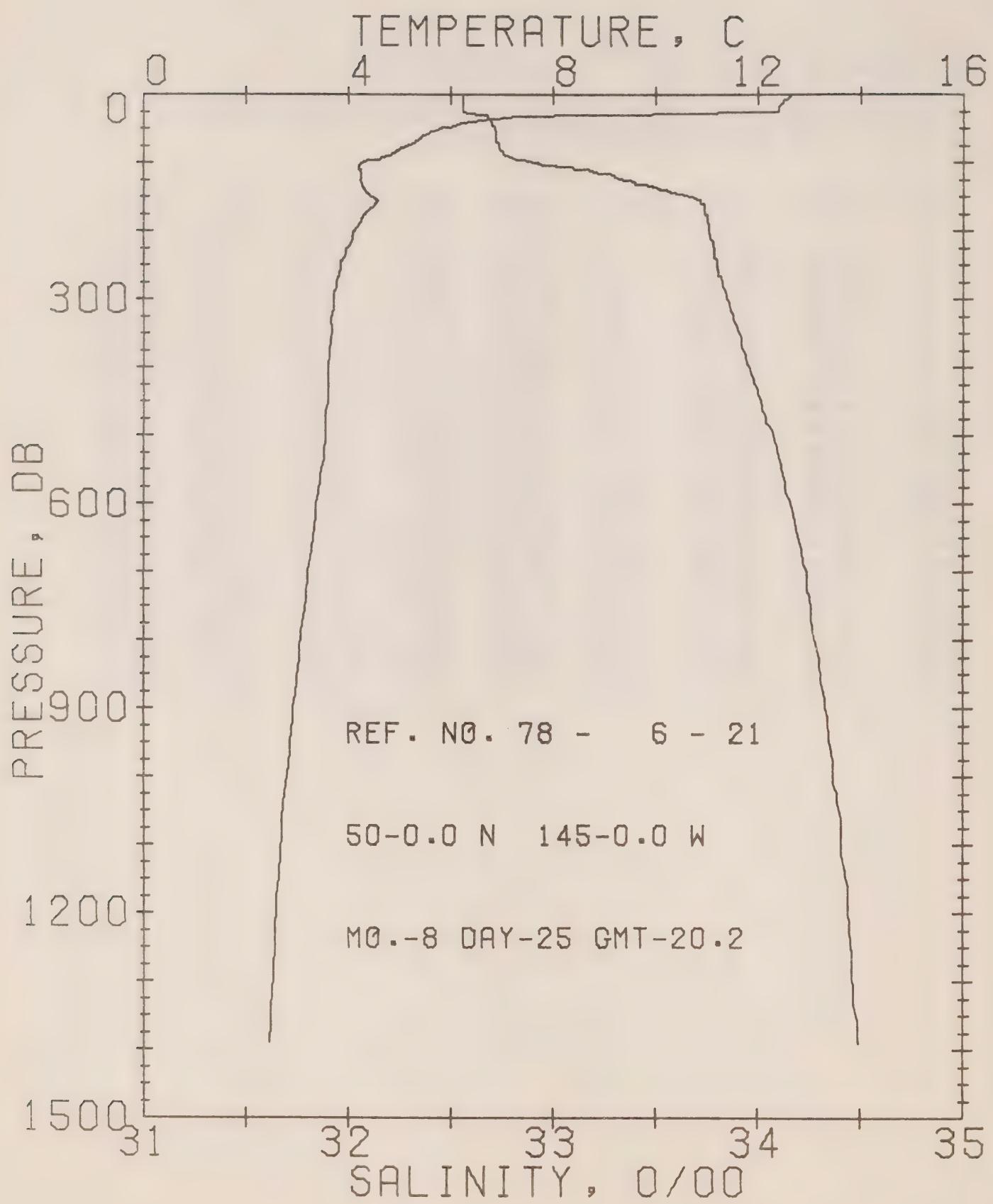
OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 20 DATE 24/ 8/78

POSITION 50- .0N, 145- .0W GMT 17.6

RESULTS OF STP CAST 266 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.39	32.60	0	24.68	327.5	.00	.00	1496.
10	12.41	32.59	10	24.67	328.8	.33	.02	1496.
20	12.41	32.58	20	24.66	329.6	.66	.07	1496.
30	11.58	32.62	30	24.84	312.3	.99	.15	1493.
50	6.18	32.72	50	25.75	225.5	1.47	.35	1474.
75	5.11	32.73	75	25.89	212.8	2.02	.69	1470.
100	4.42	32.92	99	26.11	191.5	2.53	1.15	1467.
125	4.28	33.43	124	26.53	152.0	2.96	1.64	1468.
150	4.46	33.68	149	26.71	135.3	3.32	2.14	1469.
175	4.35	33.74	174	26.77	129.9	3.65	2.69	1469.
200	4.19	33.76	199	26.80	127.0	3.97	3.30	1469.
225	4.06	33.77	223	26.83	125.1	4.28	3.98	1469.
250	3.91	33.79	248	26.86	122.3	4.59	4.73	1469.
300	3.78	33.85	298	26.92	117.0	5.19	6.41	1469.
400	3.64	33.96	397	27.02	108.0	6.32	10.43	1470.
500	3.55	34.08	496	27.12	99.0	7.35	15.16	1472.
600	3.38	34.15	595	27.19	92.6	8.31	20.52	1473.
800	3.08	34.27	793	27.32	81.7	10.06	32.95	1475.
1000	2.80	34.37	990	27.42	73.0	11.60	47.09	1477.
1200	2.61	34.43	1188	27.49	67.1	13.00	62.70	1480.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 21

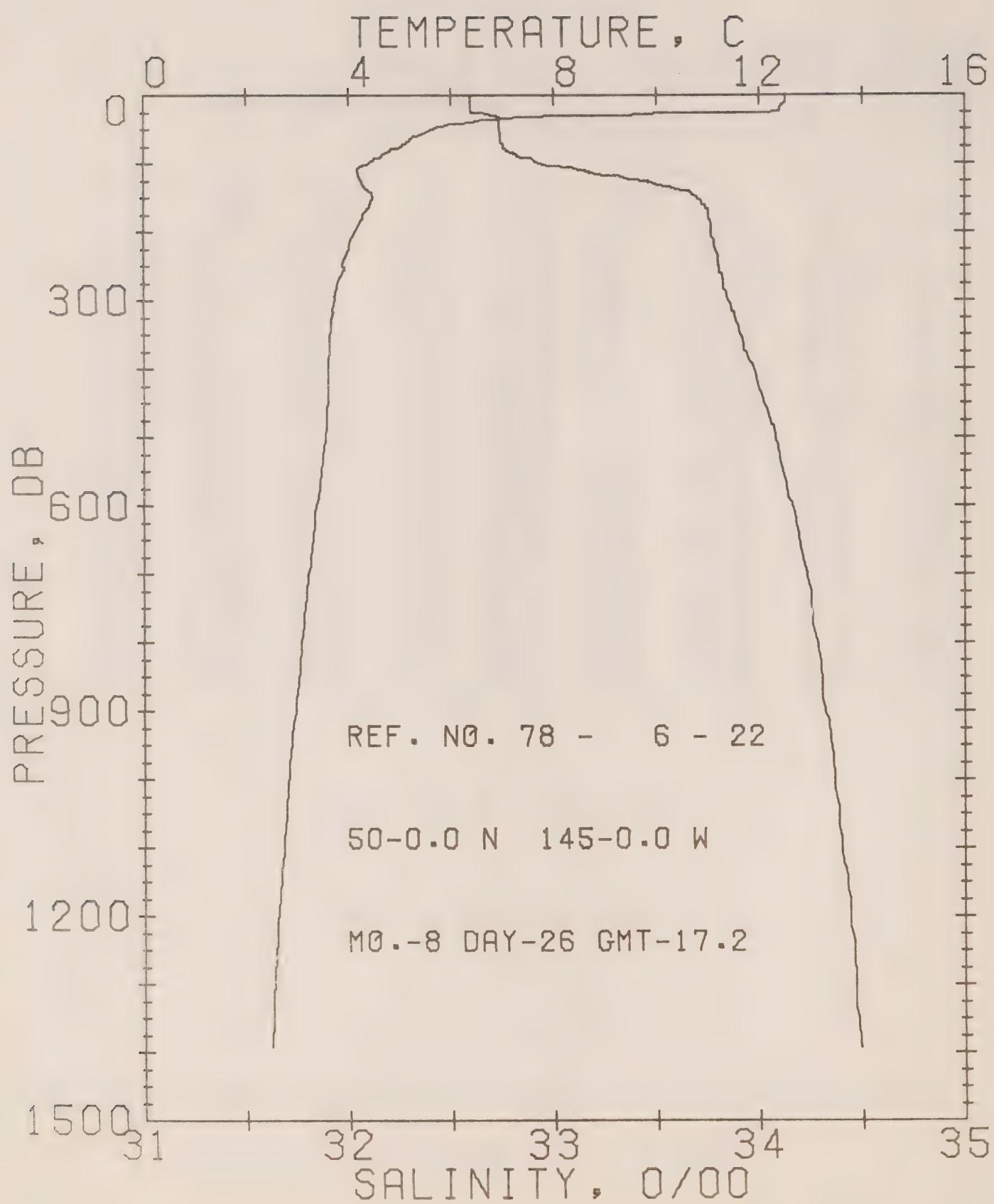
DATE 25/ 8/78

POSITION 50- .0N, 145- .0W GMT 20.2

RESULTS OF STP CAST 288 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.62	32.56	0	24.60	334.6	.00	.00	1497.
10	12.50	32.56	10	24.62	332.6	.33	.02	1496.
20	12.41	32.56	20	24.64	331.2	.67	.07	1496.
30	9.28	32.65	30	25.26	272.5	.99	.15	1485.
50	5.79	32.71	50	25.79	221.6	1.45	.34	1472.
75	5.11	32.73	75	25.89	212.8	2.00	.68	1470.
100	4.23	32.93	99	26.14	188.8	2.51	1.14	1467.
125	4.22	33.34	124	26.47	158.1	2.94	1.63	1468.
150	4.47	33.67	149	26.70	136.2	3.31	2.14	1469.
175	4.33	33.74	174	26.77	129.7	3.64	2.69	1469.
200	4.10	33.76	199	26.81	126.0	3.96	3.30	1469.
225	3.97	33.79	223	26.85	122.9	4.27	3.98	1469.
250	3.83	33.80	248	26.87	120.7	4.57	4.71	1469.
300	3.70	33.85	298	26.93	116.1	5.16	6.37	1469.
400	3.61	33.95	397	27.02	108.0	6.28	10.36	1470.
500	3.55	34.07	496	27.12	99.4	7.32	15.12	1472.
600	3.36	34.16	595	27.20	91.7	8.28	20.49	1473.
800	3.06	34.28	793	27.33	81.0	10.00	32.72	1475.
1000	2.80	34.37	990	27.42	72.6	11.53	46.71	1477.
1200	2.59	34.44	1188	27.50	66.1	12.91	62.11	1480.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 22

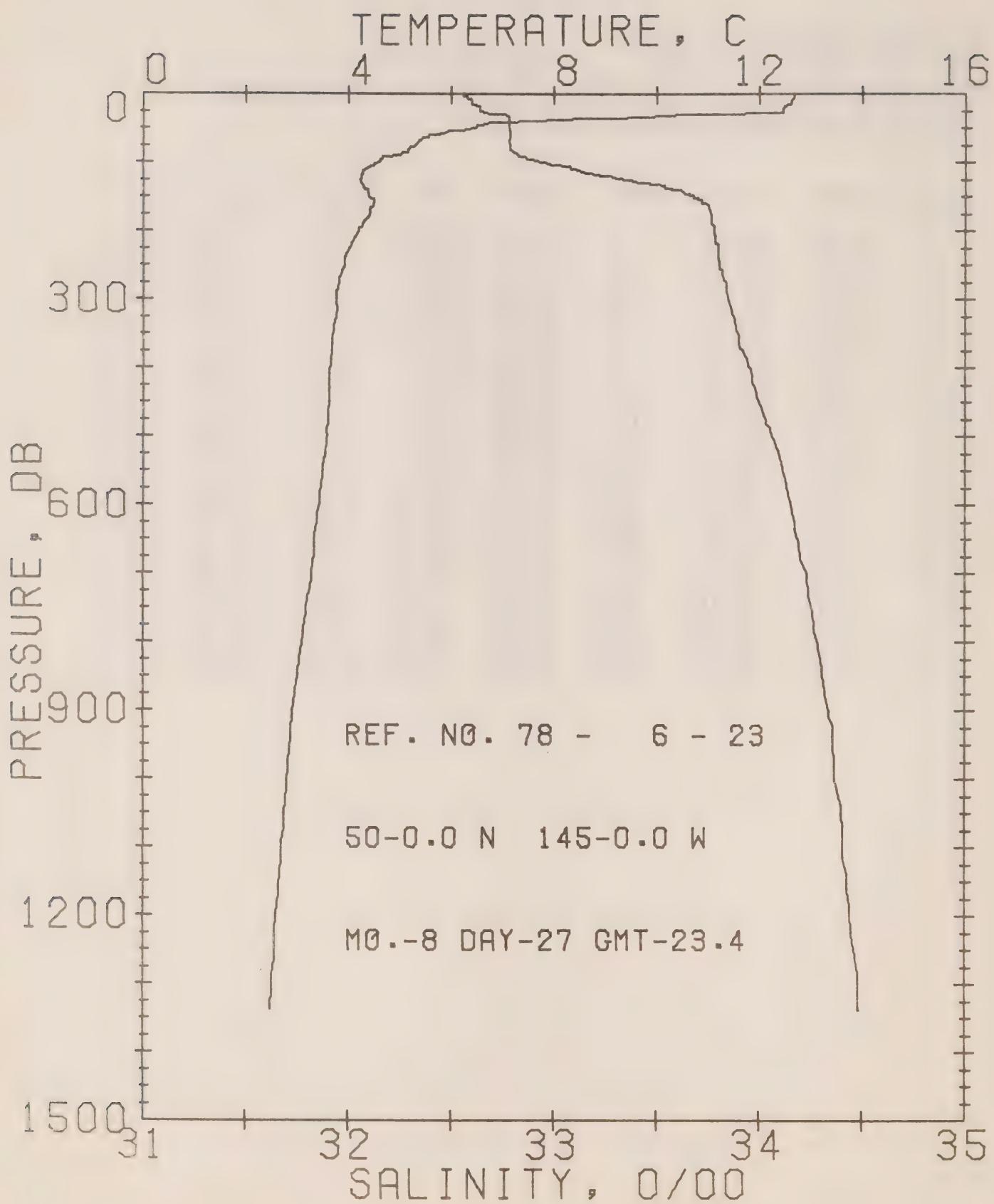
DATE 26/ 8/78

POSITION 50- .0N, 145- .0W GMT 17.2

RESULTS OF STP CAST 281 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.52	32.59	0	24.64	330.6	.00	.00	1496.
10	12.52	32.59	10	24.64	330.8	.33	.02	1496.
20	12.41	32.59	20	24.67	329.0	.66	.07	1496.
30	9.36	32.69	30	25.28	270.8	.97	.15	1486.
50	5.66	32.73	50	25.83	218.6	1.43	.33	1472.
75	5.02	32.75	75	25.92	210.3	1.96	.67	1469.
100	4.36	32.93	99	26.13	190.1	2.46	1.12	1467.
125	4.24	33.42	124	26.53	152.3	2.89	1.61	1468.
150	4.48	33.70	149	26.73	134.0	3.24	2.10	1470.
175	4.28	33.75	174	26.79	128.4	3.57	2.64	1469.
200	4.11	33.77	199	26.82	125.4	3.89	3.25	1469.
225	3.99	33.79	223	26.85	122.9	4.20	3.92	1469.
250	3.88	33.80	248	26.87	120.8	4.50	4.66	1469.
300	3.72	33.85	298	26.92	116.1	5.10	6.32	1469.
400	3.61	33.98	397	27.03	106.5	6.21	10.28	1470.
500	3.55	34.08	496	27.12	98.8	7.24	14.99	1472.
600	3.37	34.16	595	27.20	91.7	8.20	20.35	1473.
800	3.07	34.29	793	27.33	80.6	9.92	32.59	1475.
1000	2.82	34.37	990	27.42	72.9	11.45	46.64	1477.
1200	2.61	34.44	1188	27.50	66.5	12.84	62.23	1480.



## OFFSHORE OCEANOGRAPHY GROUP

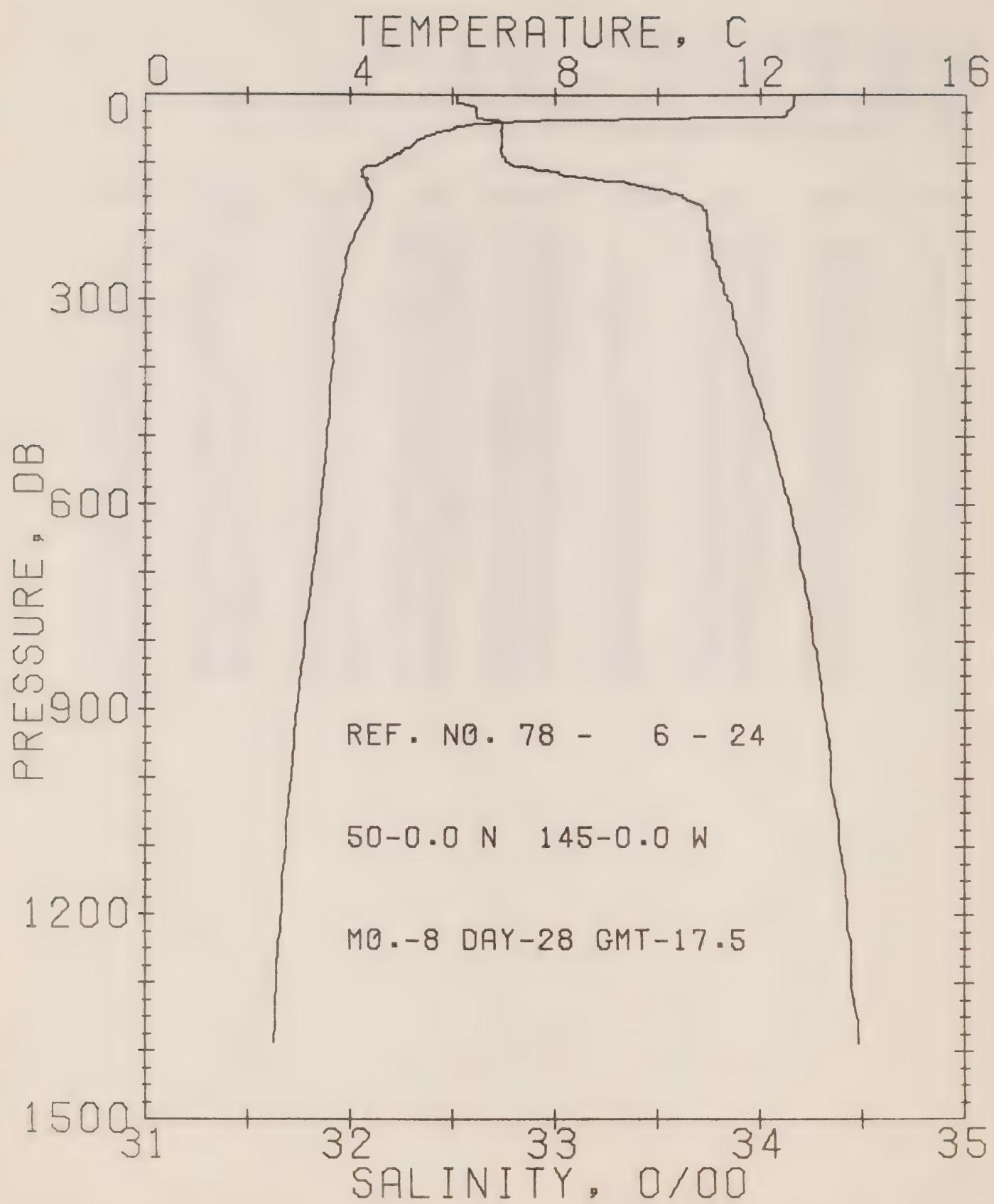
REFERENCE NO. 78- 6- 23

DATE 27/ 8/78

POSITION 50- .0N, 145- .0W GMT 23.4

RESULTS OF STP CAST 307 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.66	32.56	0	24.59	335.3	.00	.00	1497.
10	12.62	32.60	10	24.63	331.9	.33	.02	1497.
20	12.47	32.64	20	24.69	326.4	.66	.07	1496.
30	11.13	32.69	30	24.98	299.3	.99	.15	1492.
50	6.42	32.78	50	25.77	223.9	1.48	.35	1475.
75	5.29	32.79	75	25.92	210.2	2.01	.69	1470.
100	4.59	32.94	99	26.11	191.7	2.52	1.14	1468.
125	4.22	33.34	124	26.47	158.1	2.96	1.64	1468.
150	4.41	33.68	149	26.72	134.8	3.32	2.15	1469.
175	4.40	33.77	174	26.79	128.2	3.65	2.69	1470.
200	4.19	33.78	199	26.82	125.5	3.97	3.30	1469.
225	4.03	33.80	223	26.85	122.5	4.28	3.97	1469.
250	3.93	33.81	248	26.87	121.0	4.58	4.70	1469.
300	3.76	33.85	298	26.92	116.7	5.17	6.36	1469.
400	3.65	33.95	397	27.01	108.5	6.30	10.39	1470.
500	3.59	34.06	496	27.11	100.5	7.35	15.19	1472.
600	3.42	34.15	595	27.19	92.8	8.32	20.58	1473.
800	3.09	34.29	793	27.33	80.8	10.05	32.94	1475.
1000	2.80	34.37	990	27.42	72.7	11.58	46.86	1477.
1200	2.60	34.44	1188	27.50	66.2	12.96	62.33	1480.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 24 DATE 28/ 8/78

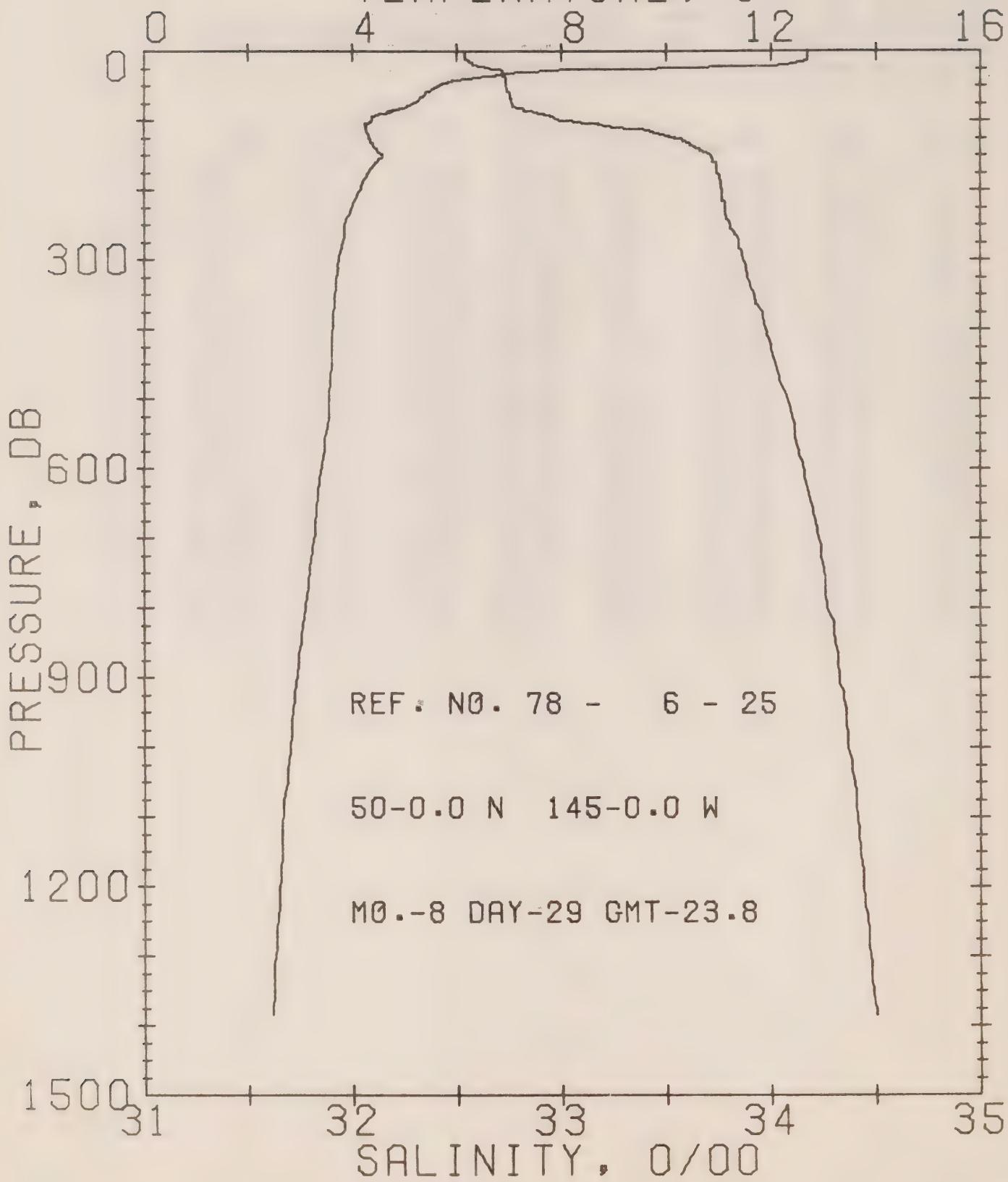
POSITION 50- .0N, 145- .0W GMT 17.5

RESULTS OF STP CAST 301 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.65	32.52	0	24.56	338.1	.00	.00	1497.
10	12.65	32.52	10	24.56	338.3	.34	.02	1497.
20	12.57	32.61	20	24.65	330.4	.67	.07	1497.
30	12.51	32.61	30	24.66	329.6	1.00	.15	1497.
50	6.02	32.74	50	25.79	222.1	1.50	.35	1473.
75	5.17	32.74	75	25.89	212.7	2.04	.70	1470.
100	4.57	32.78	99	25.99	203.5	2.57	1.16	1468.
125	4.30	33.24	124	26.38	166.5	3.03	1.69	1468.
150	4.44	33.62	149	26.67	139.6	3.40	2.21	1469.
175	4.28	33.73	174	26.77	129.6	3.74	2.77	1469.
200	4.11	33.75	199	26.80	127.2	4.06	3.38	1469.
225	3.97	33.76	223	26.83	125.0	4.37	4.06	1469.
250	3.92	33.79	248	26.86	122.2	4.68	4.81	1469.
300	3.78	33.84	298	26.91	117.6	5.28	6.49	1469.
400	3.65	33.94	397	27.00	109.3	6.41	10.51	1470.
500	3.55	34.05	496	27.10	101.1	7.46	15.32	1472.
600	3.43	34.14	595	27.19	93.5	8.44	20.78	1473.
800	3.11	34.26	793	27.31	82.9	10.19	33.27	1475.
1000	2.85	34.35	990	27.40	74.7	11.75	47.53	1477.
1200	2.65	34.43	1188	27.48	67.7	13.16	63.34	1480.

60

## TEMPERATURE, C



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 25

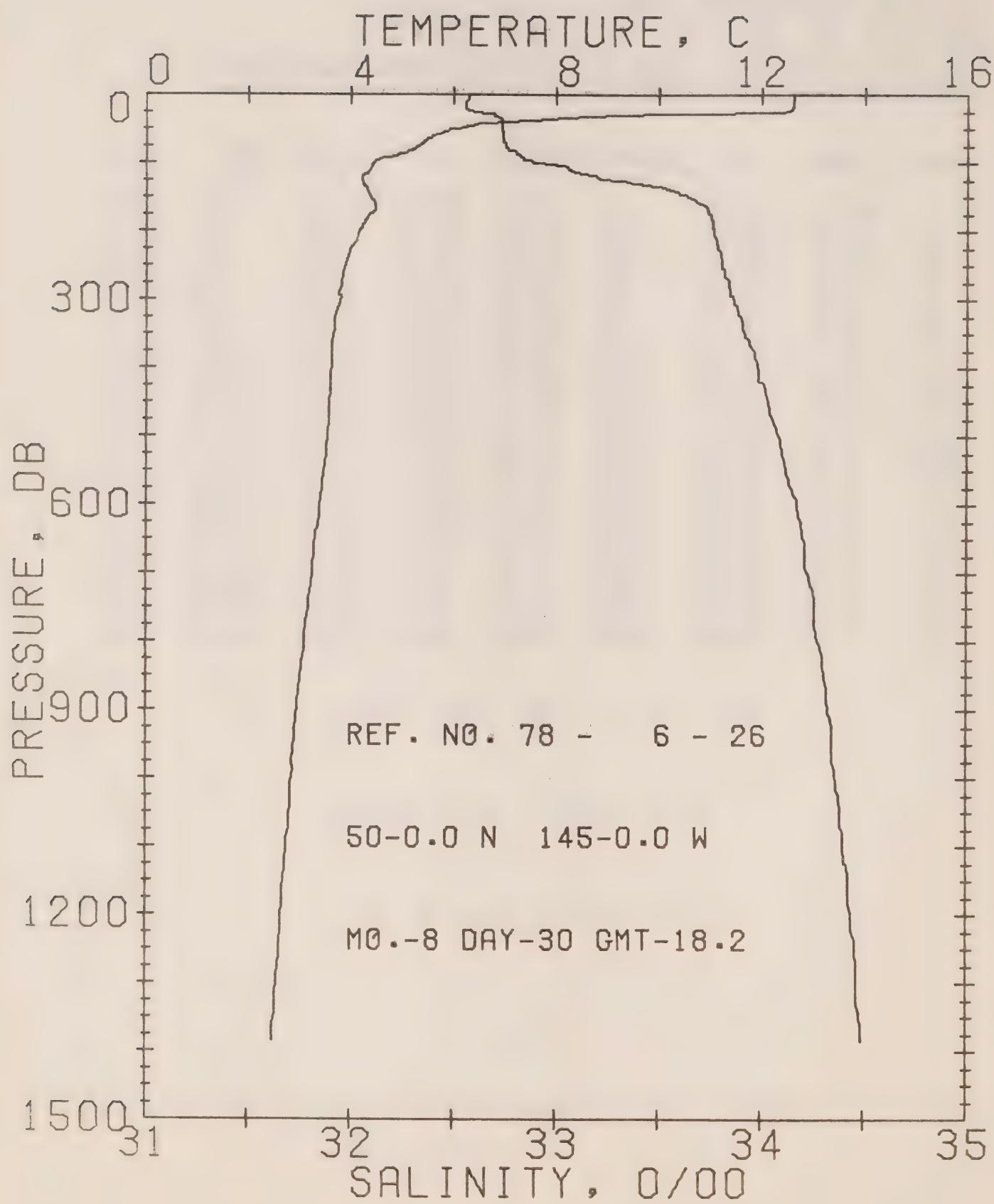
DATE 29/ 8/78

POSITION 50- .0N, 145- .0W GMT 23.8

RESULTS OF STP CAST 288 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.70	32.54	0	24.57	337.5	.00	.00	1497.
10	12.69	32.54	110	24.57	337.6	.34	.02	1497.
20	12.27	32.57	20	24.68	328.0	.67	.07	1496.
30	7.49	32.72	30	25.58	241.8	.95	.14	1478.
50	5.62	32.73	50	25.83	218.2	1.40	.32	1471.
75	5.14	32.77	75	25.92	210.1	1.94	.66	1470.
100	4.35	33.03	99	26.21	182.5	2.43	1.10	1467.
125	4.33	33.54	124	26.62	144.3	2.83	1.56	1468.
150	4.58	33.70	149	26.72	134.7	3.18	2.05	1470.
175	4.29	33.74	174	26.78	129.3	3.51	2.59	1469.
200	4.13	33.76	199	26.81	126.0	3.83	3.20	1469.
225	3.97	33.78	223	26.84	123.4	4.14	3.87	1469.
250	3.84	33.81	248	26.88	120.4	4.44	4.61	1469.
300	3.74	33.87	298	26.94	115.0	5.03	6.26	1469.
400	3.62	33.98	397	27.03	106.6	6.14	10.21	1470.
500	3.56	34.07	496	27.12	99.3	7.17	14.93	1472.
600	3.40	34.16	595	27.20	92.3	8.13	20.31	1473.
800	3.09	34.27	793	27.32	81.8	9.86	32.63	1475.
1000	2.79	34.37	990	27.42	72.6	11.39	46.58	1477.
1200	2.60	34.44	1188	27.50	66.4	12.76	61.96	1480.



## OFFSHORE OCEANOGRAPHY GROUP

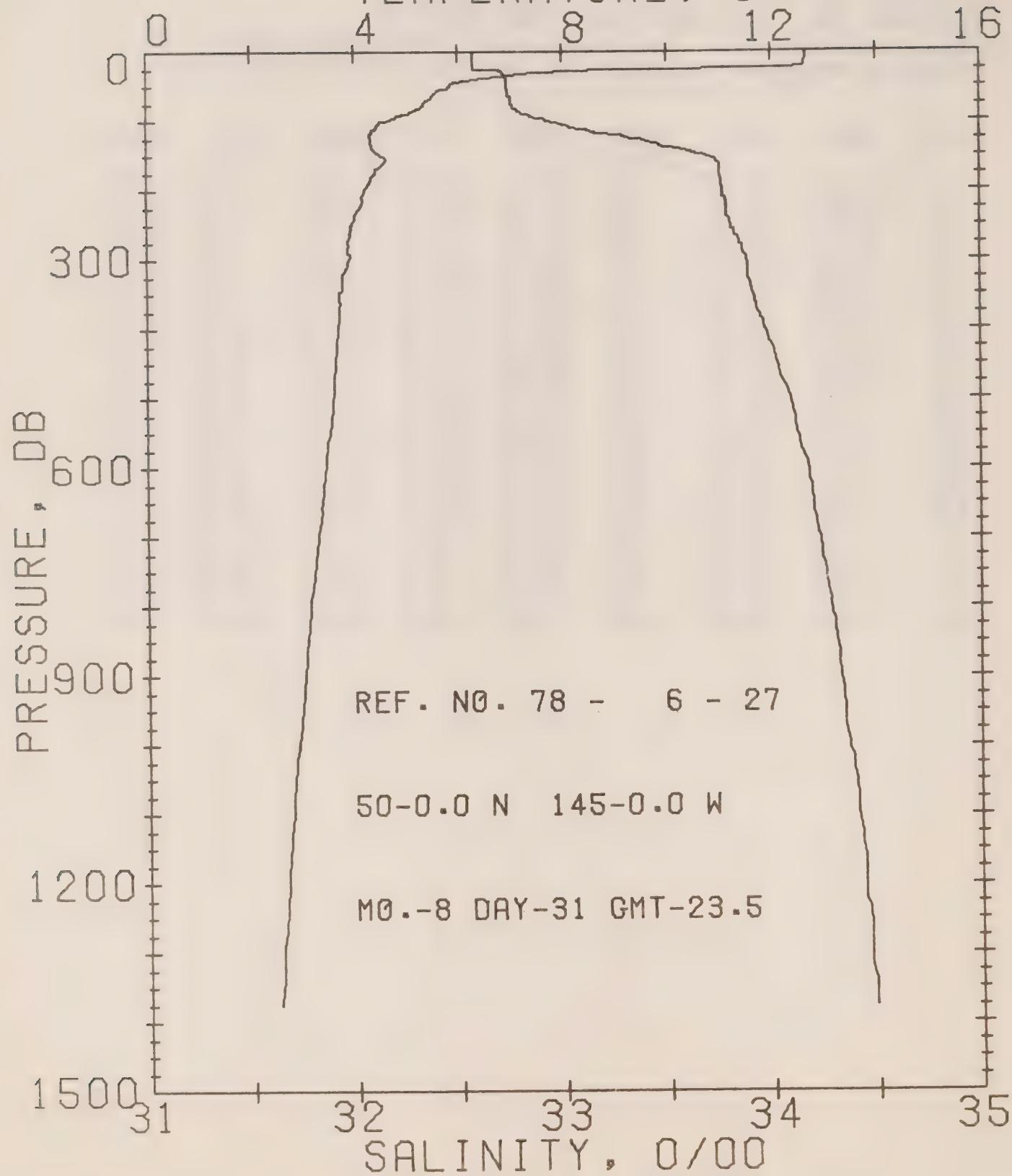
REFERENCE NO. 78- 6- 26 DATE 30/ 8/78

POSITION 50- .0N, 145- .0W GMT 18.2

RESULTS OF STP CAST 334 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.60	32.57	0	24.61	333.5	.00	.00	1496.
10	12.60	32.56	10	24.61	334.2	.33	.02	1497.
20	12.59	32.56	20	24.61	334.5	.67	.07	1497.
30	9.68	32.69	30	25.23	275.3	.99	.15	1487.
50	6.08	32.73	50	25.78	223.5	1.47	.34	1473.
75	5.29	32.75	75	25.89	213.2	2.01	.69	1470.
100	4.43	32.90	99	26.10	193.1	2.52	1.14	1467.
125	4.21	33.29	124	26.43	161.8	2.96	1.65	1467.
150	4.40	33.64	149	26.69	137.7	3.33	2.16	1469.
175	4.36	33.75	174	26.78	129.3	3.66	2.71	1470.
200	4.16	33.77	199	26.81	126.0	3.98	3.32	1469.
225	3.98	33.79	223	26.85	122.8	4.29	4.00	1469.
250	3.90	33.81	248	26.87	120.7	4.60	4.73	1469.
300	3.80	33.87	298	26.93	115.6	5.19	6.39	1469.
400	3.62	33.98	397	27.04	106.0	6.29	10.32	1470.
500	3.55	34.08	496	27.12	98.7	7.32	15.01	1472.
600	3.39	34.17	595	27.21	91.1	8.27	20.35	1473.
800	3.08	34.28	793	27.33	81.0	9.99	32.59	1475.
1000	2.85	34.36	990	27.41	73.6	11.52	46.65	1478.
1200	2.64	34.44	1188	27.49	66.9	12.93	62.34	1480.

TEMPERATURE, C



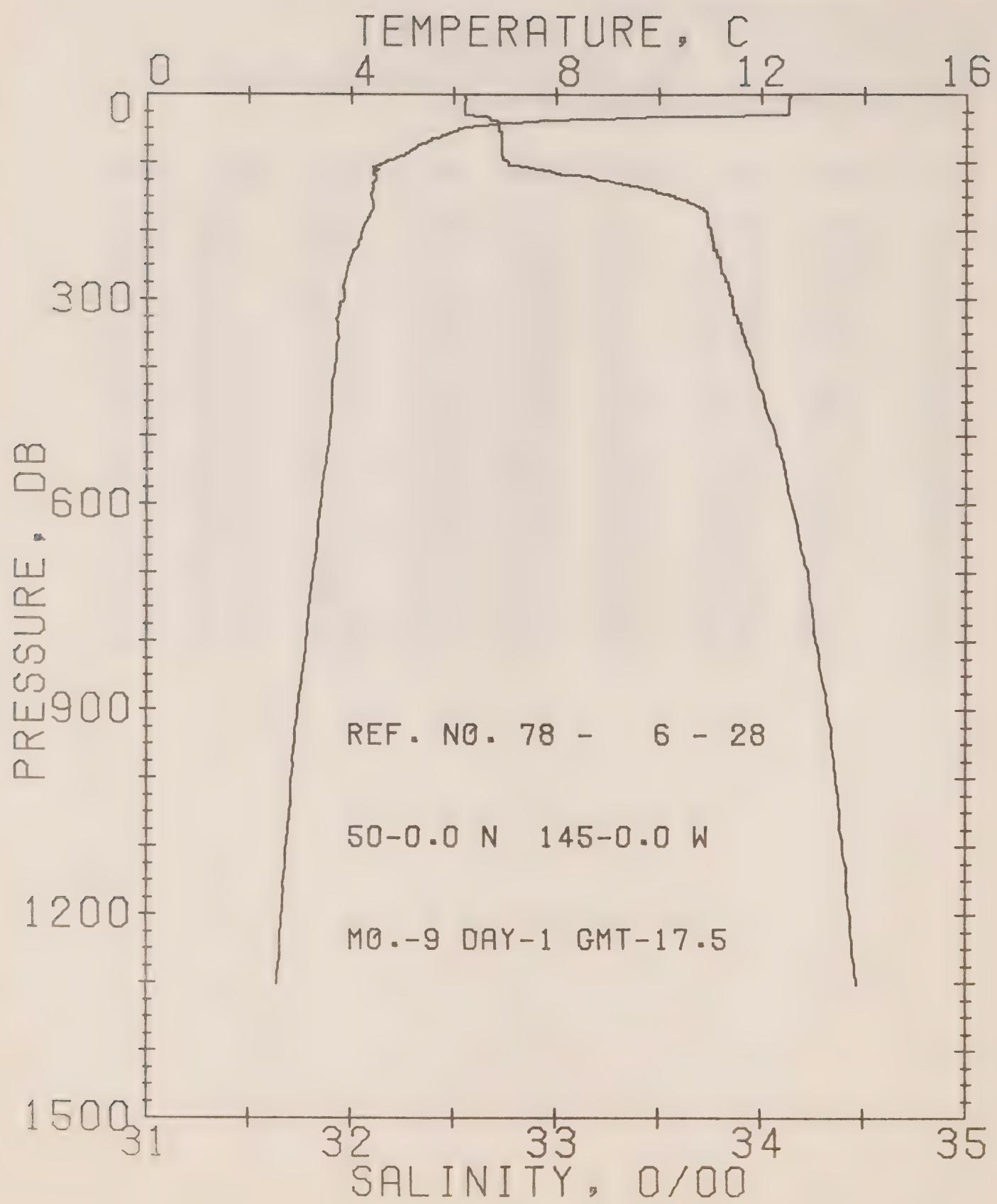
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 27 DATE 31/ 8/78

POSITION 50- .0N, 145- .0W GMT 23.5

RESULTS OF STP CAST 320 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	DELTA	POT.	SOUND
				T	D	EN		
0	12.66	32.57	0	24.60	334.6	.00	.00	1497.
10	12.66	32.57	10	24.60	334.9	.33	.02	1497.
20	12.64	32.57	20	24.61	334.7	.67	.07	1497.
30	7.57	32.71	30	25.56	243.6	.96	.14	1479.
50	5.84	32.73	50	25.80	220.7	1.42	.33	1472.
75	5.33	32.75	75	25.88	213.7	1.96	.67	1471.
100	4.51	32.92	99	26.11	192.4	2.47	1.13	1468.
125	4.33	33.33	124	26.45	160.0	2.91	1.63	1468.
150	4.55	33.68	149	26.70	136.3	3.28	2.15	1470.
175	4.39	33.75	174	26.78	129.6	3.61	2.69	1470.
200	4.19	33.77	199	26.81	126.2	3.93	3.30	1469.
225	4.07	33.79	223	26.84	123.7	4.24	3.98	1469.
250	3.94	33.81	248	26.87	121.0	4.55	4.72	1469.
300	3.90	33.88	298	26.93	115.8	5.14	6.38	1470.
400	3.69	33.97	397	27.02	107.7	6.26	10.37	1471.
500	3.58	34.09	496	27.13	98.6	7.29	15.09	1472.
600	3.42	34.17	595	27.21	91.2	8.25	20.43	1473.
800	3.13	34.28	793	27.33	81.2	9.97	32.72	1475.
1000	2.88	34.37	990	27.42	73.5	11.52	46.87	1478.
1200	2.67	34.44	1188	27.49	67.2	12.91	62.43	1480.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 28

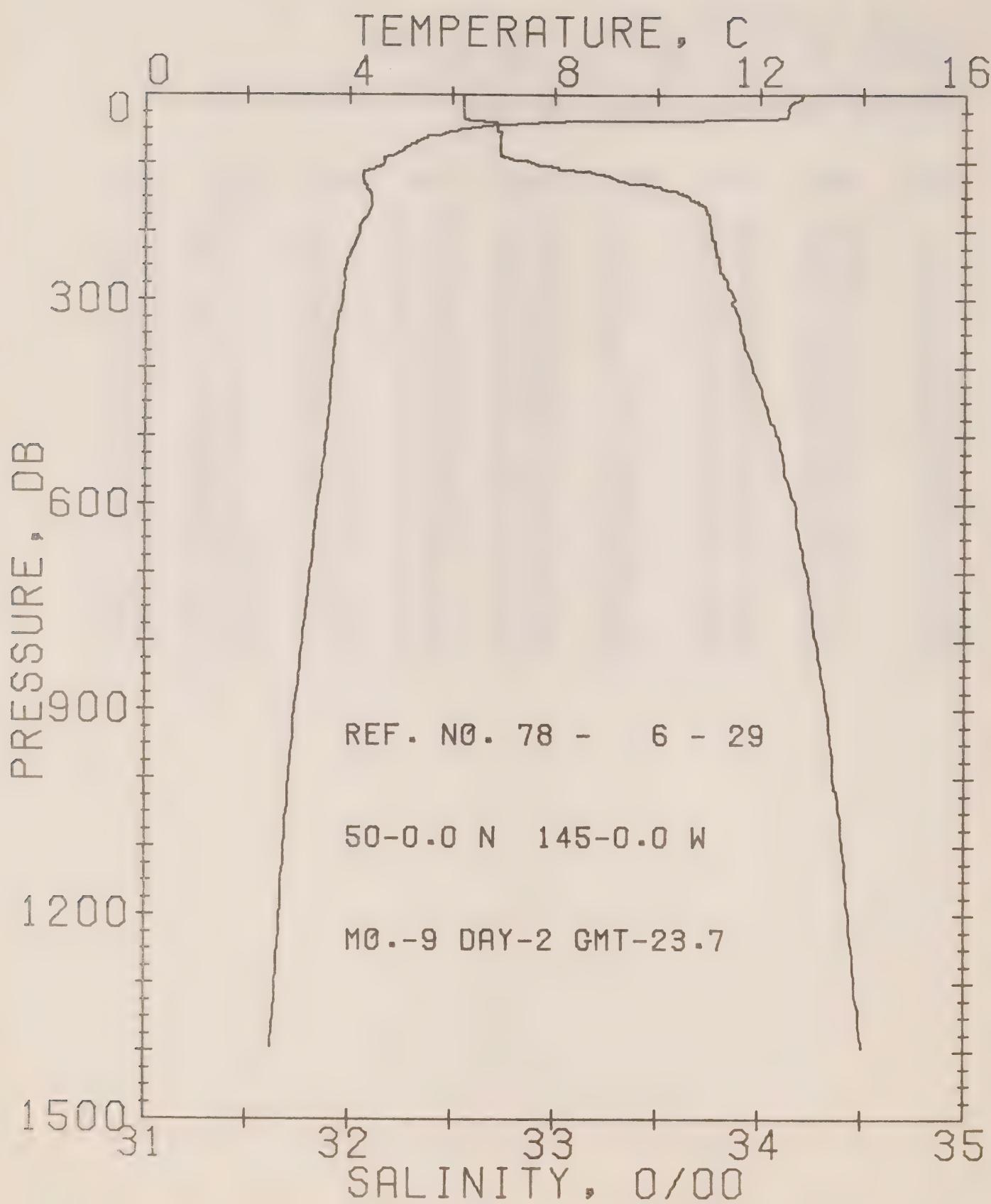
DATE 1/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.5

RESULTS OF STP CAST 303 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.55	32.56	0	24.62	333.3	.00	.00	1496.
10	12.53	32.55	10	24.61	333.7	.33	.02	1496.
20	12.54	32.55	20	24.61	334.3	.67	.07	1497.
30	12.54	32.55	30	24.61	334.6	1.00	.15	1497.
50	6.10	32.72	50	25.76	224.5	1.51	.36	1473.
75	5.29	32.73	75	25.87	214.7	2.06	.71	1470.
100	4.65	32.77	99	25.97	205.1	2.59	1.18	1468.
125	4.47	33.20	124	26.33	171.2	3.06	1.72	1468.
150	4.38	33.57	149	26.64	142.4	3.44	2.26	1469.
175	4.35	33.73	174	26.76	130.7	3.78	2.82	1469.
200	4.21	33.75	199	26.79	127.9	4.11	3.43	1469.
225	4.09	33.77	223	26.82	125.4	4.42	4.12	1469.
250	3.95	33.80	248	26.86	121.9	4.73	4.86	1469.
300	3.88	33.86	298	26.92	117.1	5.33	6.53	1470.
400	3.68	33.96	397	27.01	108.4	6.45	10.53	1471.
500	3.58	34.07	496	27.11	99.8	7.49	15.29	1472.
600	3.41	34.15	595	27.19	93.0	8.45	20.68	1473.
800	3.12	34.27	793	27.31	82.2	10.19	33.05	1475.
1000	2.84	34.37	990	27.42	73.2	11.73	47.17	1477.
1200	2.65	34.44	1188	27.49	67.2	13.14	62.90	1480.



## OFFSHORE OCEANOGRAPHY GROUP

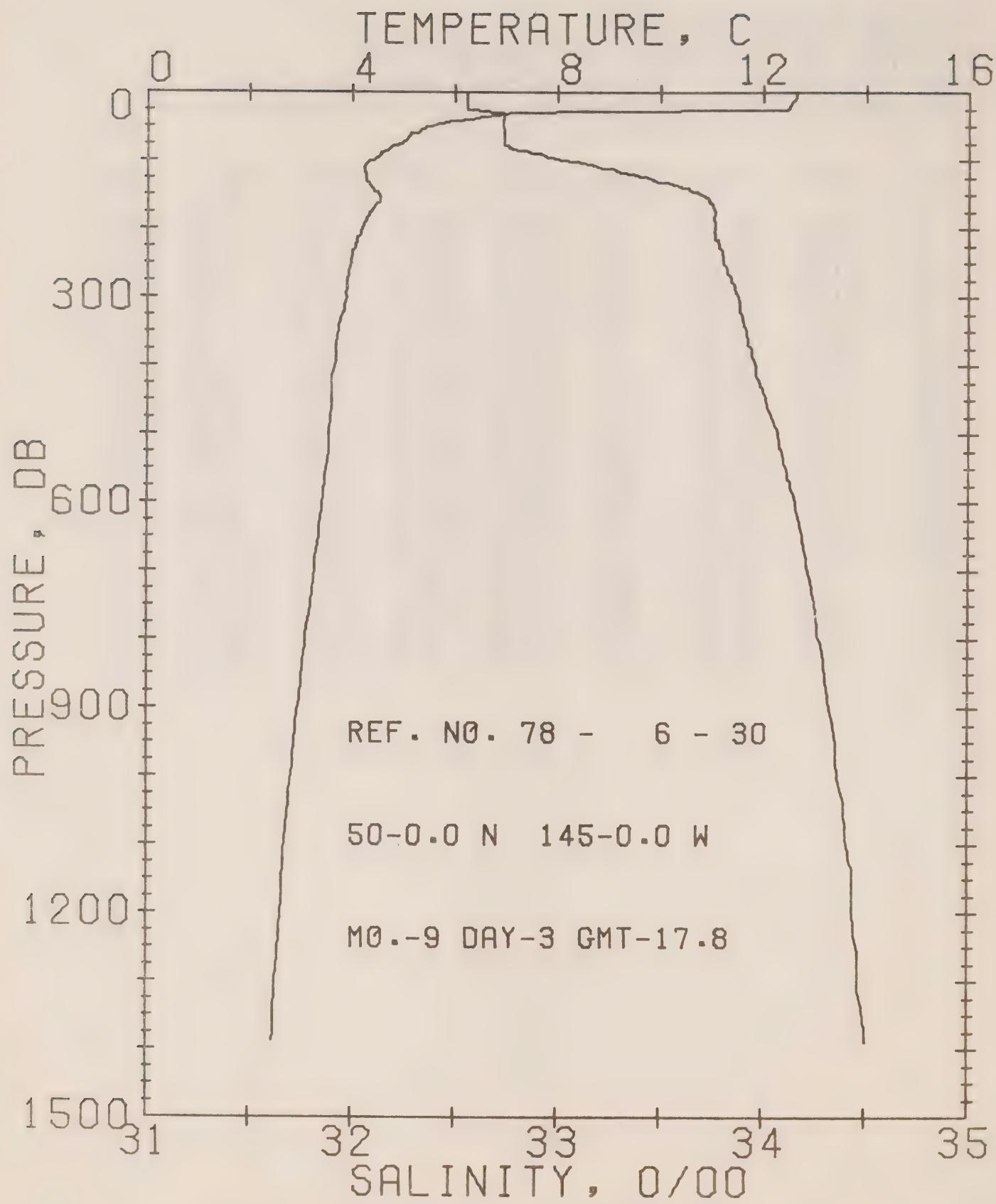
REFERENCE NO. 78- 6- 29

DATE 2/ 9/78

POSITION 50- .0N, 145- .0W GMT 23.7

RESULTS OF STP CAST 321 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.82	32.55	0	24.56	339.0	.00	.00	1497.
10	12.68	32.55	10	24.58	336.7	.34	.02	1497.
20	12.54	32.55	20	24.61	334.4	.67	.07	1497.
30	12.53	32.55	30	24.61	334.4	1.01	.15	1497.
50	6.23	32.72	50	25.75	226.1	1.55	.37	1474.
75	5.14	32.73	75	25.89	213.0	2.10	.72	1470.
100	4.65	32.90	99	26.07	195.3	2.62	1.18	1468.
125	4.28	33.31	124	26.44	161.0	3.06	1.68	1468.
150	4.42	33.65	149	26.69	137.2	3.42	2.20	1469.
175	4.35	33.74	174	26.78	129.5	3.76	2.75	1469.
200	4.19	33.76	199	26.80	126.9	4.08	3.36	1469.
225	4.04	33.78	223	26.84	124.1	4.39	4.04	1469.
250	3.93	33.80	248	26.87	121.4	4.70	4.78	1469.
300	3.87	33.88	298	26.93	115.8	5.29	6.44	1470.
400	3.66	33.97	397	27.02	107.4	6.41	10.42	1471.
500	3.56	34.08	496	27.13	98.5	7.44	15.15	1472.
600	3.37	34.17	595	27.21	90.7	8.39	20.46	1473.
800	3.08	34.28	793	27.32	81.3	10.11	32.72	1475.
1000	2.83	34.36	990	27.41	73.6	11.65	46.77	1477.
1200	2.64	34.44	1188	27.49	67.0	13.04	62.38	1480.



## OFFSHORE OCEANOGRAPHY GROUP

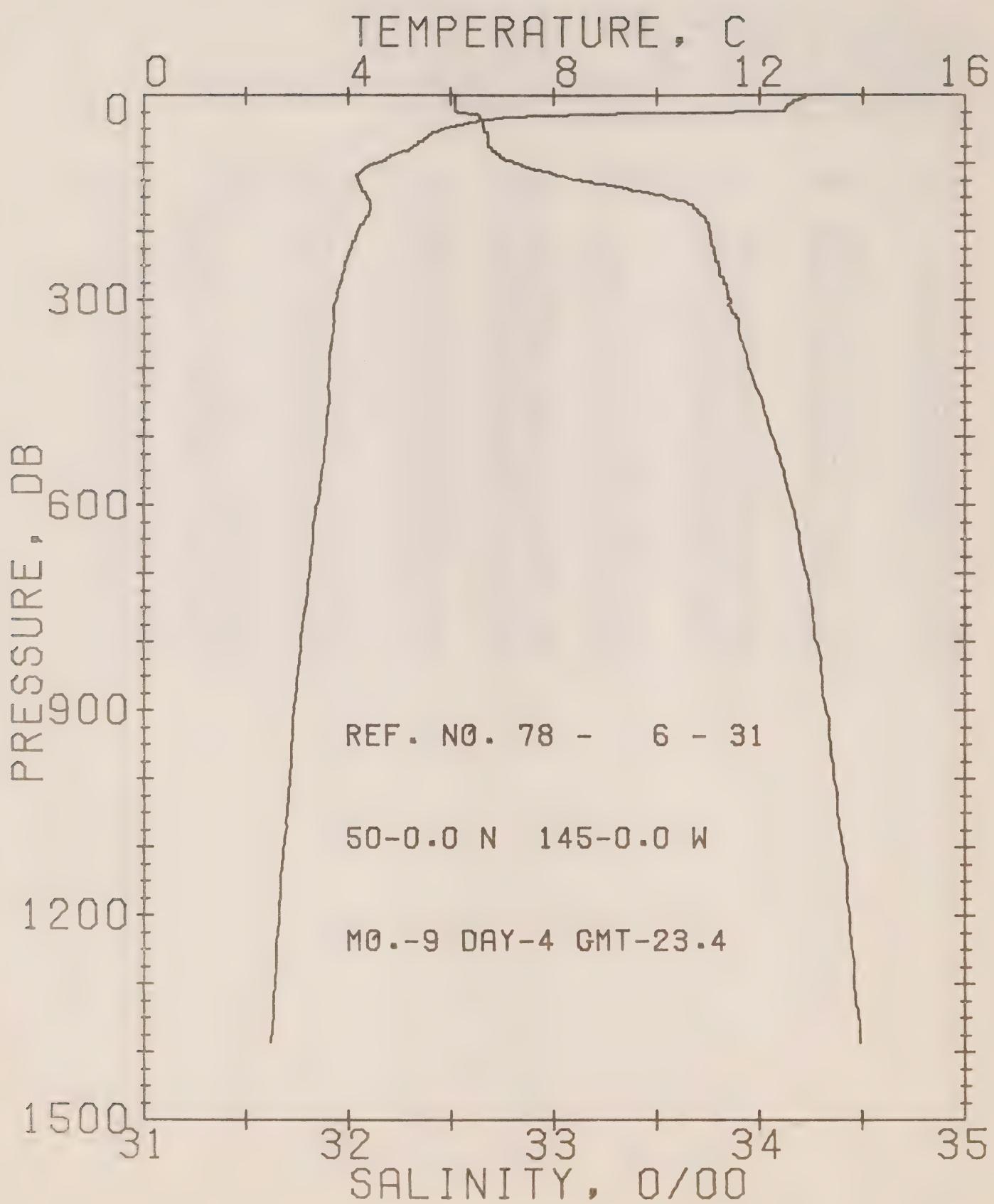
REFERENCE NO. 78- 6- 30 DATE 3/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.8

RESULTS OF STP CAST 297 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED. PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.65	32.56	0	24.60	335.2	.00	.00	1497.
10	12.63	32.56	10	24.60	335.0	.34	.02	1497.
20	12.52	32.56	20	24.62	333.2	.67	.07	1497.
30	7.35	32.69	30	25.58	242.2	.98	.15	1478.
50	5.54	32.73	50	25.84	217.3	1.43	.33	1471.
75	4.97	32.74	75	25.91	210.5	1.96	.67	1469.
100	4.32	33.04	99	26.22	181.5	2.46	1.11	1467.
125	4.27	33.43	124	26.53	151.9	2.87	1.58	1468.
150	4.53	33.69	149	26.71	135.3	3.23	2.08	1470.
175	4.34	33.77	174	26.80	127.6	3.56	2.62	1469.
200	4.18	33.77	199	26.81	126.2	3.87	3.23	1469.
225	4.04	33.79	223	26.84	123.4	4.19	3.91	1469.
250	3.97	33.81	248	26.87	121.4	4.49	4.65	1469.
300	3.89	33.88	298	26.93	115.6	5.08	6.30	1470.
400	3.66	33.97	397	27.02	107.7	6.20	10.28	1471.
500	3.56	34.07	496	27.11	99.6	7.24	15.04	1472.
600	3.42	34.16	595	27.20	92.4	8.20	20.43	1473.
800	3.09	34.28	793	27.32	81.2	9.94	32.79	1475.
1000	2.82	34.37	990	27.42	72.9	11.47	46.81	1477.
1200	2.61	34.44	1188	27.50	66.4	12.85	62.21	1480.



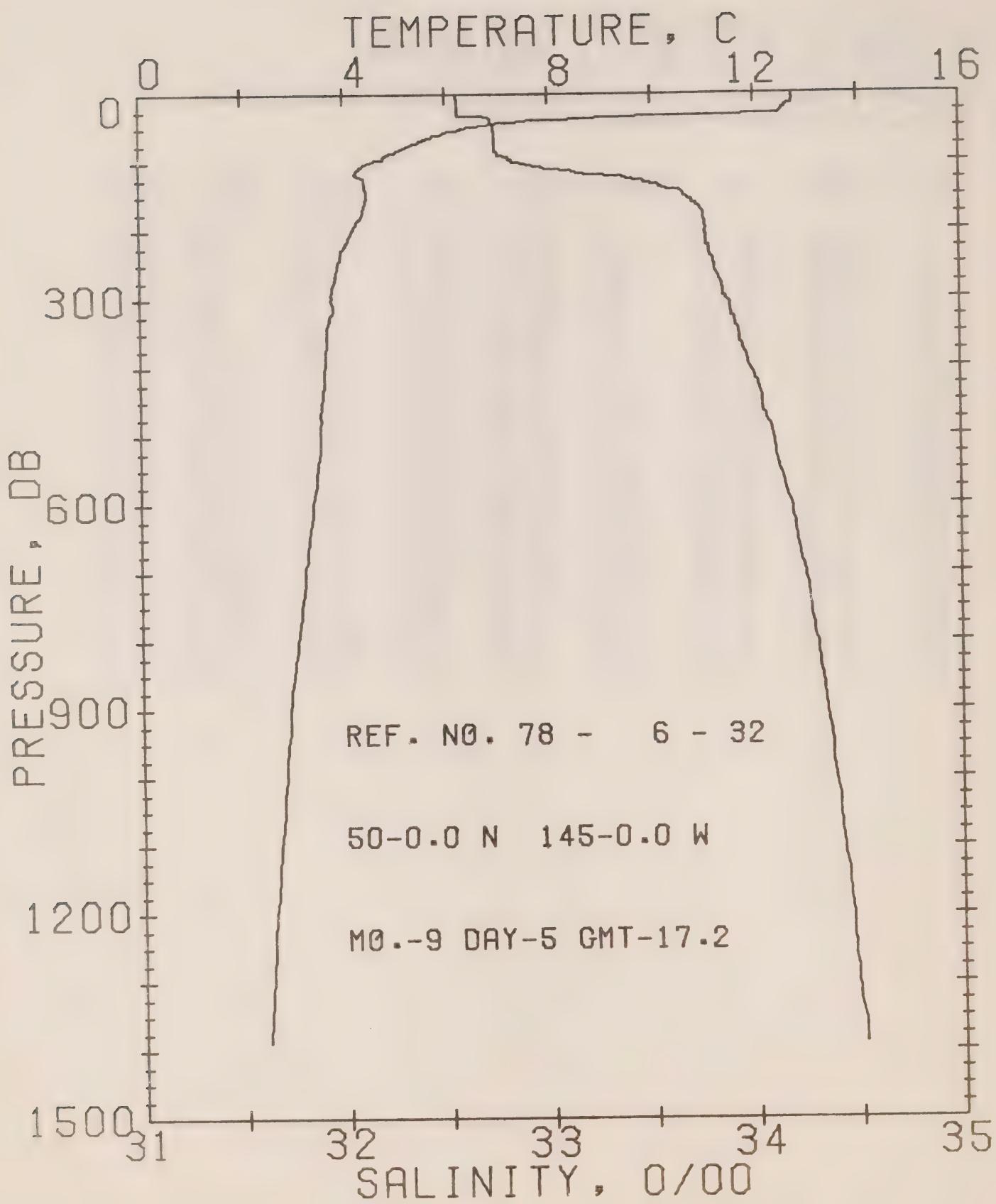
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 31 DATE 4/ 9/78

POSITION 50- .0N, 145- .0W GMT 23.4

RESULTS OF STP CAST 301 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.87	32.52	0	24.52	342.2	.00	.00	1497.
10	12.65	32.52	10	24.56	338.3	.34	.02	1497.
20	12.51	32.52	20	24.59	336.0	.68	.07	1496.
30	7.79	32.64	30	25.48	251.8	.98	.15	1480.
50	5.80	32.66	50	25.75	225.5	1.45	.34	1472.
75	5.25	32.68	75	25.83	218.0	2.01	.69	1470.
100	4.48	32.82	99	26.03	199.6	2.53	1.16	1468.
125	4.19	33.13	124	26.30	173.6	3.00	1.69	1467.
150	4.37	33.55	149	26.62	144.1	3.39	2.24	1469.
175	4.39	33.71	174	26.74	132.6	3.73	2.81	1470.
200	4.17	33.76	199	26.80	127.0	4.06	3.42	1469.
225	4.04	33.78	223	26.84	124.1	4.37	4.10	1469.
250	3.92	33.80	248	26.86	121.6	4.68	4.85	1469.
300	3.76	33.86	298	26.92	116.2	5.27	6.51	1469.
400	3.63	33.95	397	27.01	108.7	6.39	10.50	1470.
500	3.56	34.06	496	27.11	100.4	7.44	15.28	1472.
600	3.38	34.16	595	27.20	92.0	8.40	20.66	1473.
800	3.07	34.28	793	27.33	81.1	10.12	32.92	1475.
1000	2.85	34.36	990	27.41	73.9	11.66	47.00	1477.
1200	2.63	34.44	1188	27.49	66.7	13.06	62.65	1480.



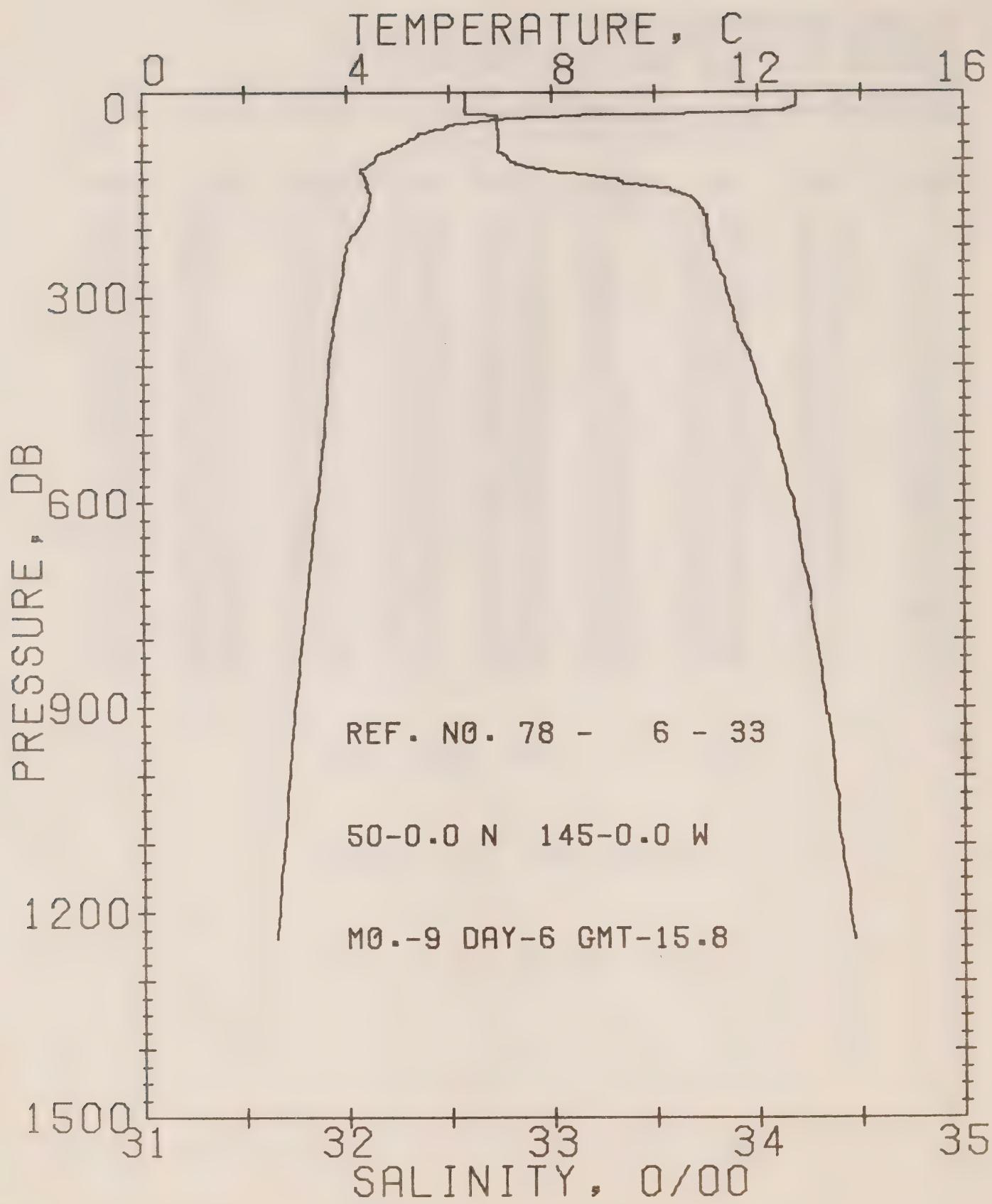
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 32 DATE 5/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.2

RESULTS OF STP CAST 314 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	DELTA	POT.	SOUND
				T	D		EN	
0	12.76	32.55	0	24.57	337.9	.00	.00	1497.
10	12.77	32.56	10	24.57	337.6	.34	.02	1497.
20	12.61	32.56	20	24.60	334.9	.67	.07	1497.
30	12.49	32.56	30	24.63	332.9	1.01	.15	1497.
50	6.37	32.73	50	25.74	227.0	1.52	.36	1474.
75	5.26	32.74	75	25.88	213.6	2.06	.71	1470.
100	4.48	32.85	99	26.05	197.3	2.58	1.17	1468.
125	4.40	33.44	124	26.53	152.5	3.03	1.67	1468.
150	4.45	33.66	149	26.70	136.7	3.38	2.18	1469.
175	4.36	33.75	174	26.78	129.2	3.72	2.72	1470.
200	4.16	33.76	199	26.81	126.7	4.04	3.33	1469.
225	3.98	33.78	223	26.84	123.6	4.35	4.01	1469.
250	3.87	33.81	248	26.88	120.4	4.65	4.75	1469.
300	3.74	33.86	298	26.93	115.7	5.24	6.41	1469.
400	3.62	33.97	397	27.03	106.6	6.35	10.35	1470.
500	3.53	34.08	496	27.13	98.2	7.38	15.03	1472.
600	3.36	34.17	595	27.21	90.7	8.33	20.36	1473.
800	3.04	34.30	793	27.34	79.6	10.03	32.48	1475.
1000	2.79	34.38	990	27.43	71.8	11.54	46.26	1477.
1200	2.57	34.46	1188	27.51	64.7	12.90	61.51	1480.



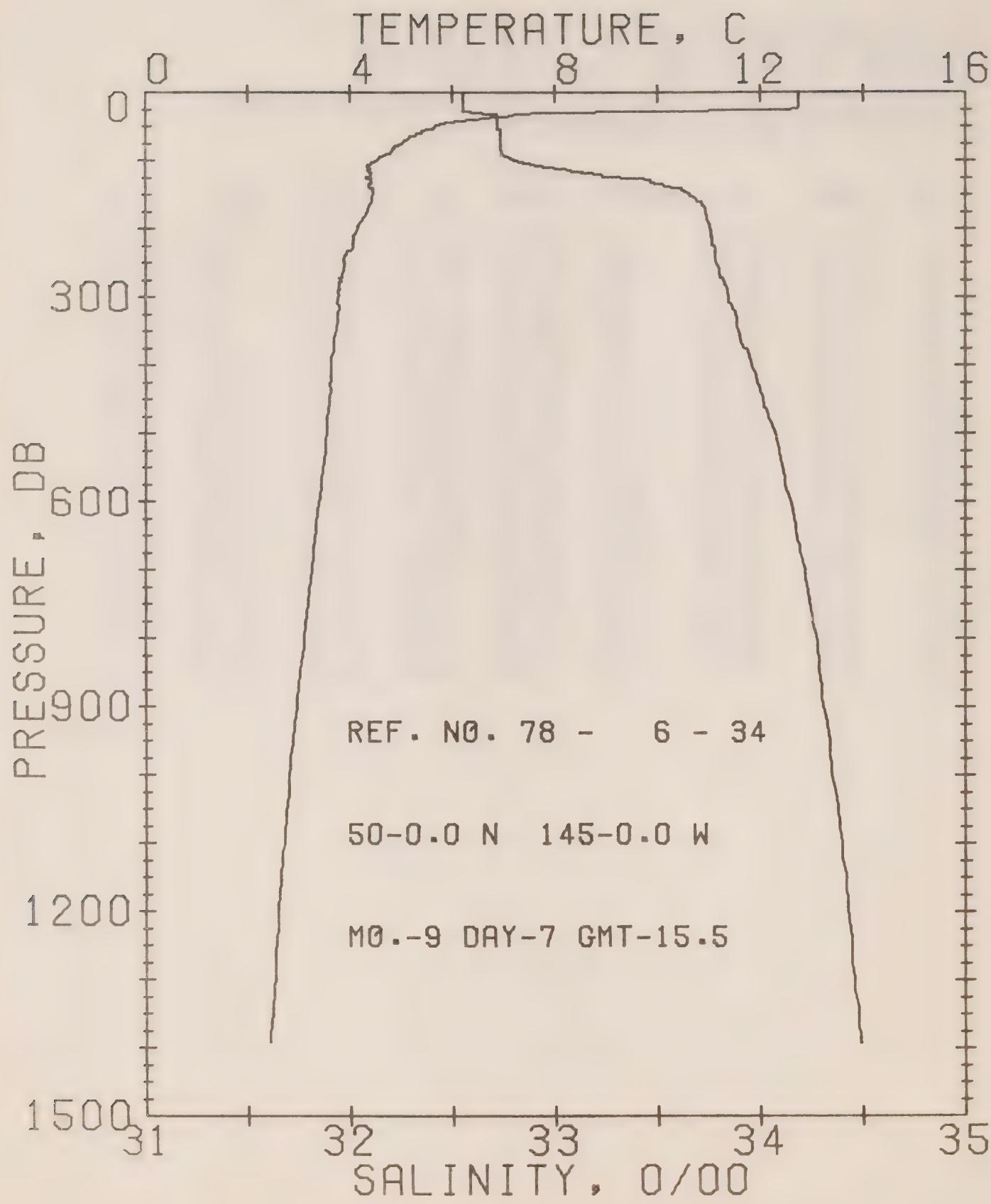
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 33 DATE 6/ 9/78

POSITION 50- .0N, 145- .0W GMT 15.8

RESULTS OF STP CAST 264 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.76	32.57	0	24.58	336.4	.00	.00	1497.
10	12.76	32.58	10	24.59	335.9	.34	.02	1497.
20	12.74	32.58	20	24.59	335.8	.67	.07	1497.
30	11.85	32.58	30	24.76	319.9	1.00	.15	1494.
50	5.95	32.73	50	25.79	222.0	1.49	.35	1473.
75	5.09	32.74	75	25.90	211.8	2.03	.69	1470.
100	4.54	32.80	99	26.00	201.9	2.55	1.15	1468.
125	4.34	33.26	124	26.39	165.4	3.02	1.69	1468.
150	4.47	33.64	149	26.68	138.4	3.39	2.21	1469.
175	4.38	33.73	174	26.76	131.0	3.73	2.77	1470.
200	4.23	33.76	199	26.80	127.5	4.05	3.38	1469.
225	3.98	33.77	223	26.83	124.3	4.36	4.06	1469.
250	3.92	33.80	248	26.86	121.7	4.67	4.81	1469.
300	3.84	33.86	298	26.92	116.9	5.27	6.47	1470.
400	3.64	33.98	397	27.03	106.6	6.38	10.45	1470.
500	3.54	34.08	496	27.12	98.6	7.41	15.15	1472.
600	3.39	34.17	595	27.21	91.2	8.36	20.46	1473.
800	3.09	34.28	793	27.32	81.3	10.08	32.73	1475.
1000	2.84	34.37	990	27.42	73.1	11.62	46.77	1477.
1200	2.63	34.44	1188	27.50	66.6	13.01	62.40	1480.



## OFFSHORE OCEANOGRAPHY GROUP

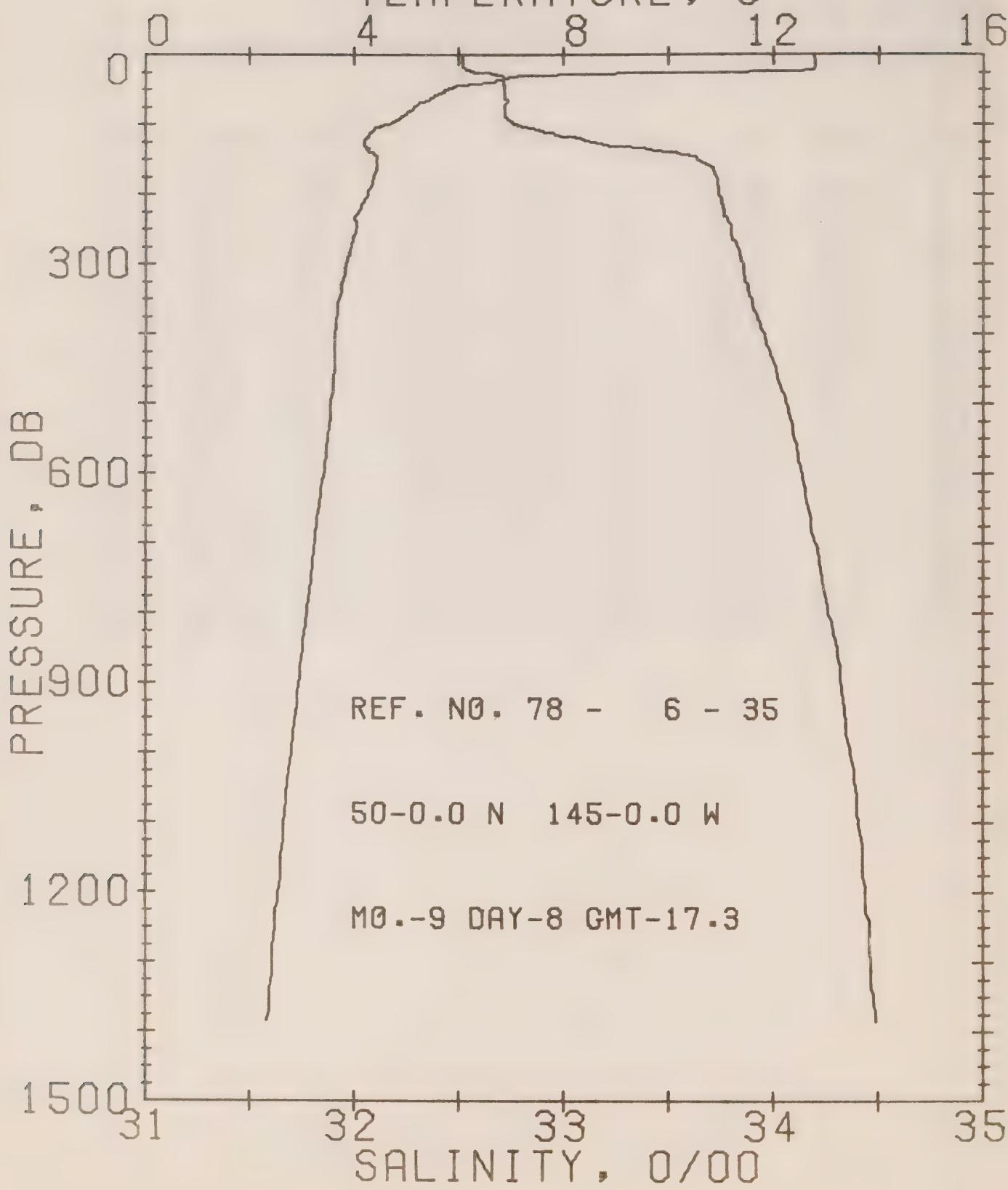
REFERENCE NO. 78- 6- 34

POSITION 50- .0N, 145- .0W DATE 7/ 9/78

RESULTS OF STP CAST 268 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.75	32.55	0	24.57	337.7	.00	.00	1497.
10	12.75	32.55	10	24.57	338.0	.34	.02	1497.
20	12.75	32.55	20	24.57	338.2	.68	.07	1497.
30	8.32	32.59	30	25.36	262.9	1.00	.15	1482.
50	5.65	32.72	50	25.82	219.3	1.46	.34	1471.
75	4.98	32.73	75	25.90	211.3	1.99	.68	1469.
100	4.47	32.81	99	26.02	200.2	2.51	1.14	1468.
125	4.33	33.33	124	26.45	160.0	2.97	1.66	1468.
150	4.44	33.65	149	26.69	137.1	3.33	2.17	1469.
175	4.33	33.73	174	26.77	130.4	3.66	2.72	1469.
200	4.15	33.75	199	26.80	127.1	3.99	3.33	1469.
225	4.05	33.77	223	26.83	124.8	4.30	4.01	1469.
250	3.89	33.79	248	26.86	122.2	4.61	4.76	1469.
300	3.77	33.85	298	26.92	116.8	5.21	6.43	1469.
400	3.64	33.96	397	27.02	108.0	6.33	10.44	1470.
500	3.54	34.07	496	27.12	99.3	7.37	15.20	1472.
600	3.39	34.15	595	27.19	92.8	8.33	20.59	1473.
800	3.10	34.27	793	27.32	81.7	10.08	33.01	1475.
1000	2.81	34.35	990	27.41	74.2	11.63	47.25	1477.
1200	2.60	34.43	1188	27.49	67.0	13.04	62.95	1480.

TEMPERATURE, C



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 35

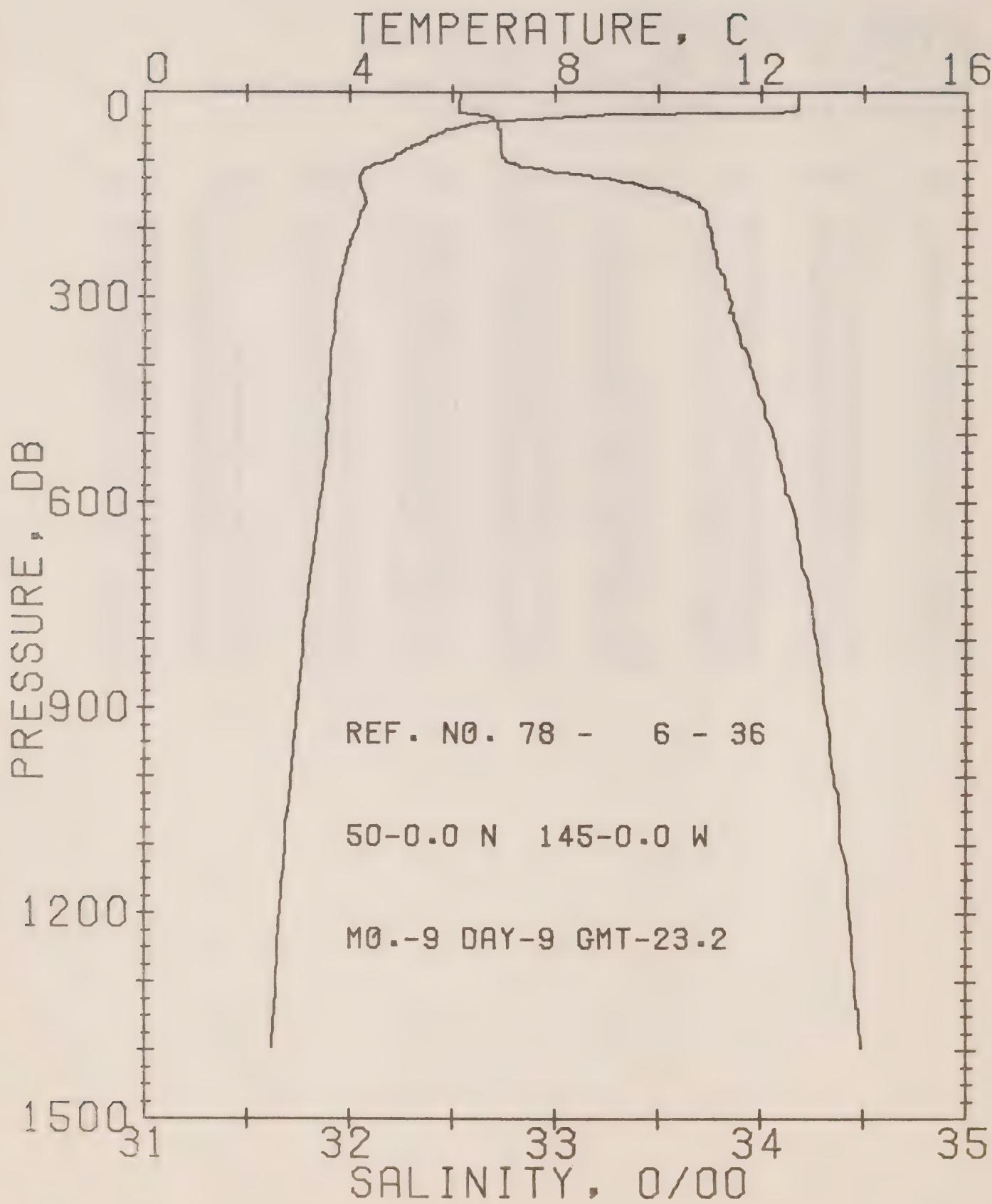
DATE 8/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.3

RESULTS OF STP CAST 301 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED.PRESSIONS ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.78	32.52	0	24.54	340.5	.00	.00	1497.
10	12.79	32.52	10	24.54	340.9	.34	.02	1497.
20	12.79	32.53	20	24.54	340.8	.68	.07	1497.
30	7.80	32.68	30	25.51	249.0	.98	.15	1480.
50	5.79	32.72	50	25.80	220.9	1.44	.33	1472.
75	5.15	32.72	75	25.88	213.9	1.99	.68	1470.
100	4.59	32.77	99	25.98	204.5	2.51	1.15	1468.
125	4.20	33.13	124	26.30	173.9	2.99	1.69	1467.
150	4.44	33.63	149	26.68	138.4	3.37	2.22	1469.
175	4.37	33.72	174	26.76	131.2	3.71	2.78	1470.
200	4.26	33.74	199	26.78	129.2	4.03	3.40	1470.
225	4.07	33.77	223	26.82	125.2	4.35	4.09	1469.
250	4.04	33.80	248	26.85	122.8	4.66	4.84	1469.
300	3.86	33.86	298	26.92	117.1	5.26	6.52	1470.
400	3.64	33.96	397	27.02	108.1	6.39	10.55	1470.
500	3.56	34.06	496	27.11	100.3	7.43	15.33	1472.
600	3.41	34.14	595	27.18	93.9	8.40	20.77	1473.
800	3.09	34.26	793	27.31	82.7	10.17	33.31	1475.
1000	2.80	34.37	990	27.42	72.7	11.71	47.40	1477.
1200	2.52	34.44	1188	27.50	65.5	13.08	62.79	1479.



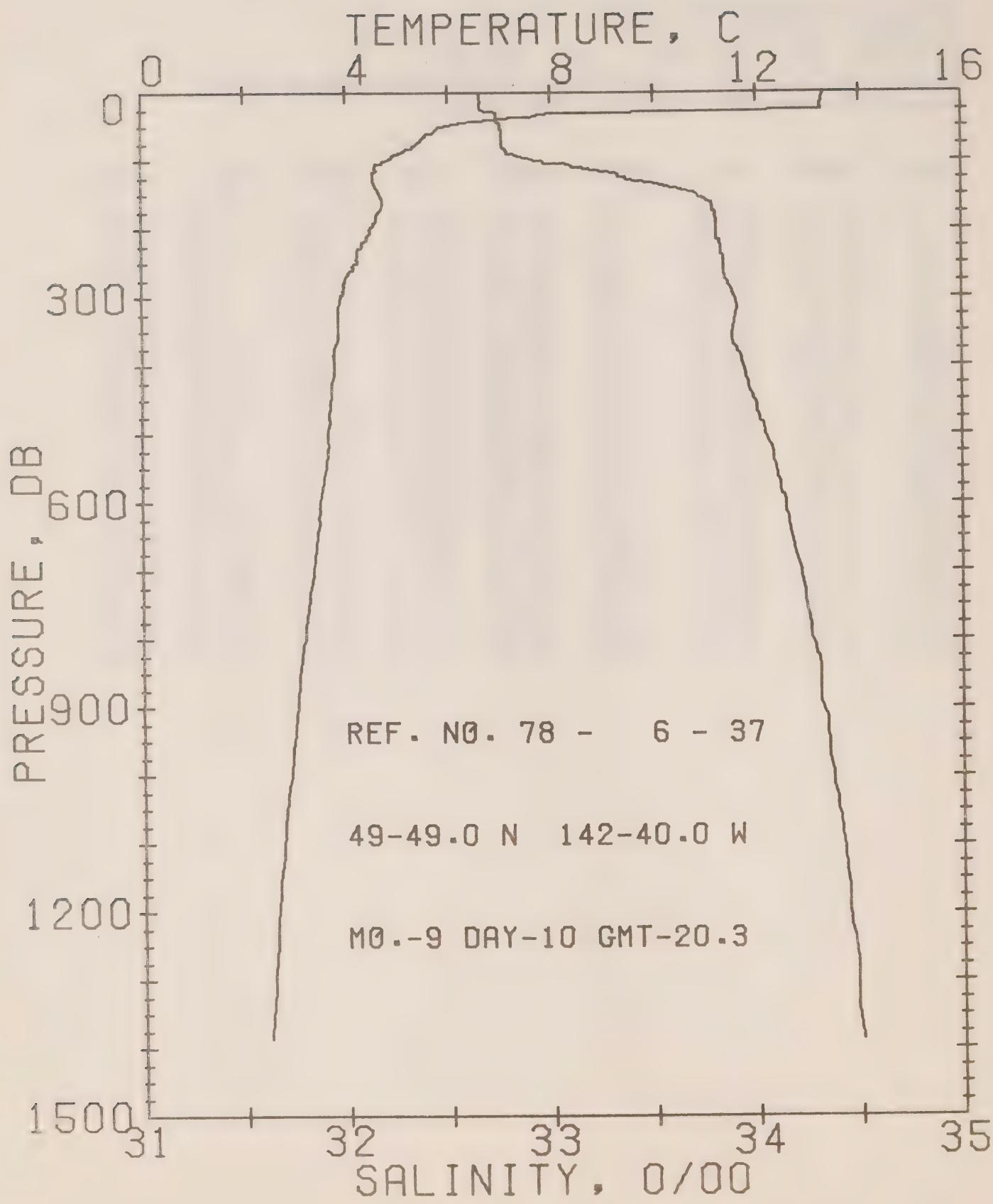
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 36 DATE 9/ 9/78

POSITION 50- .0N, 145- .0W GMT 23.2

RESULTS OF STP CAST 304 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED.PPRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.73	32.54	0	24.56	338.1	.00	.00	1497.
10	12.72	32.53	10	24.56	338.7	.34	.02	1497.
20	12.73	32.53	20	24.56	339.2	.68	.07	1497.
30	12.35	32.53	30	24.63	332.6	1.02	.16	1496.
50	6.21	32.72	50	25.75	225.8	1.52	.36	1474.
75	5.36	32.73	75	25.86	215.5	2.06	.71	1471.
100	4.69	32.75	99	25.95	207.0	2.59	1.18	1468.
125	4.20	33.18	124	26.34	169.9	3.07	1.72	1467.
150	4.30	33.59	149	26.66	140.4	3.45	2.25	1469.
175	4.22	33.73	174	26.78	129.3	3.78	2.80	1469.
200	4.10	33.75	199	26.81	126.8	4.10	3.41	1469.
225	3.99	33.77	223	26.83	124.3	4.41	4.09	1469.
250	3.91	33.79	248	26.86	122.2	4.72	4.84	1469.
300	3.75	33.85	298	26.92	116.5	5.32	6.51	1469.
400	3.63	33.95	397	27.01	108.6	6.45	10.53	1470.
500	3.56	34.06	496	27.10	100.6	7.49	15.32	1472.
600	3.41	34.14	595	27.19	93.3	8.47	20.76	1473.
800	3.09	34.27	793	27.32	81.8	10.21	33.17	1475.
1000	2.86	34.36	990	27.41	74.2	11.77	47.42	1478.
1200	2.63	34.43	1188	27.49	67.2	13.17	63.14	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 37

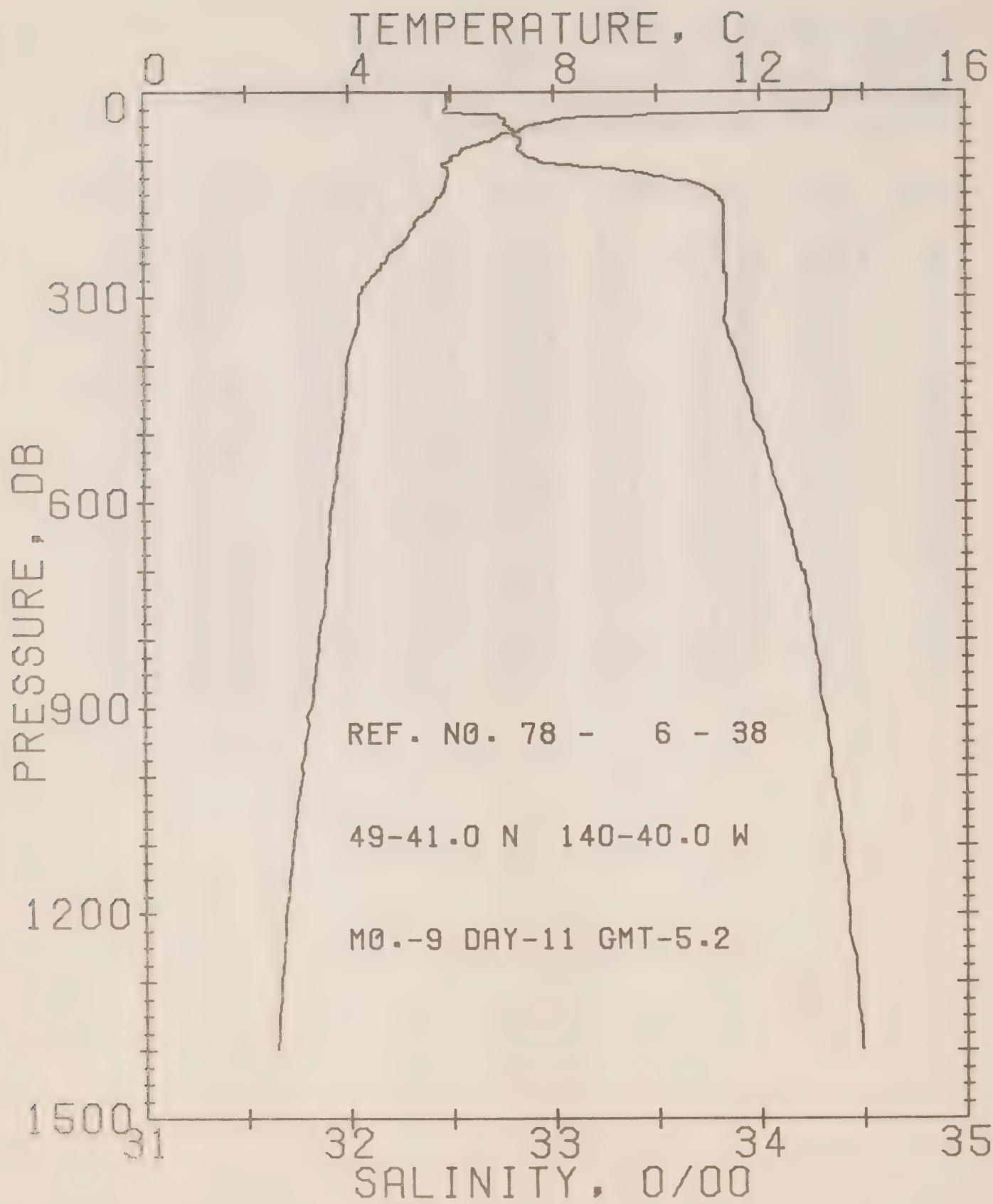
DATE 10/ 9/78

POSITION 49-49.0N, 142-40.0W GMT 20.3 STATION 12

RESULTS OF STP CAST 328 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	13.30	32.66	0	24.55	339.9	.00	.00	1499.
10	13.28	32.65	10	24.54	340.5	.34	.02	1499.
20	13.26	32.65	20	24.55	340.4	.68	.07	1499.
30	8.88	32.73	30	25.38	260.6	1.01	.15	1484.
50	5.86	32.75	50	25.82	219.4	1.47	.34	1472.
75	5.37	32.76	75	25.88	213.4	2.01	.68	1471.
100	4.72	32.95	99	26.11	192.3	2.53	1.14	1469.
125	4.53	33.36	124	26.45	159.8	2.97	1.64	1469.
150	4.68	33.70	149	26.71	135.8	3.33	2.15	1470.
175	4.63	33.79	174	26.78	128.9	3.66	2.70	1471.
200	4.46	33.81	199	26.82	126.1	3.98	3.31	1470.
225	4.30	33.83	223	26.85	123.1	4.29	3.98	1470.
250	4.21	33.84	248	26.87	121.6	4.60	4.72	1470.
300	3.88	33.89	298	26.94	114.6	5.19	6.38	1470.
400	3.75	33.93	397	26.99	111.0	6.33	10.44	1471.
500	3.64	34.04	496	27.08	102.7	7.39	15.33	1472.
600	3.47	34.14	595	27.18	94.3	8.38	20.86	1473.
800	3.15	34.27	793	27.31	82.9	10.15	33.47	1475.
1000	2.87	34.37	990	27.42	73.4	11.70	47.65	1478.
1200	2.61	34.44	1188	27.50	66.2	13.09	63.15	1480.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 38

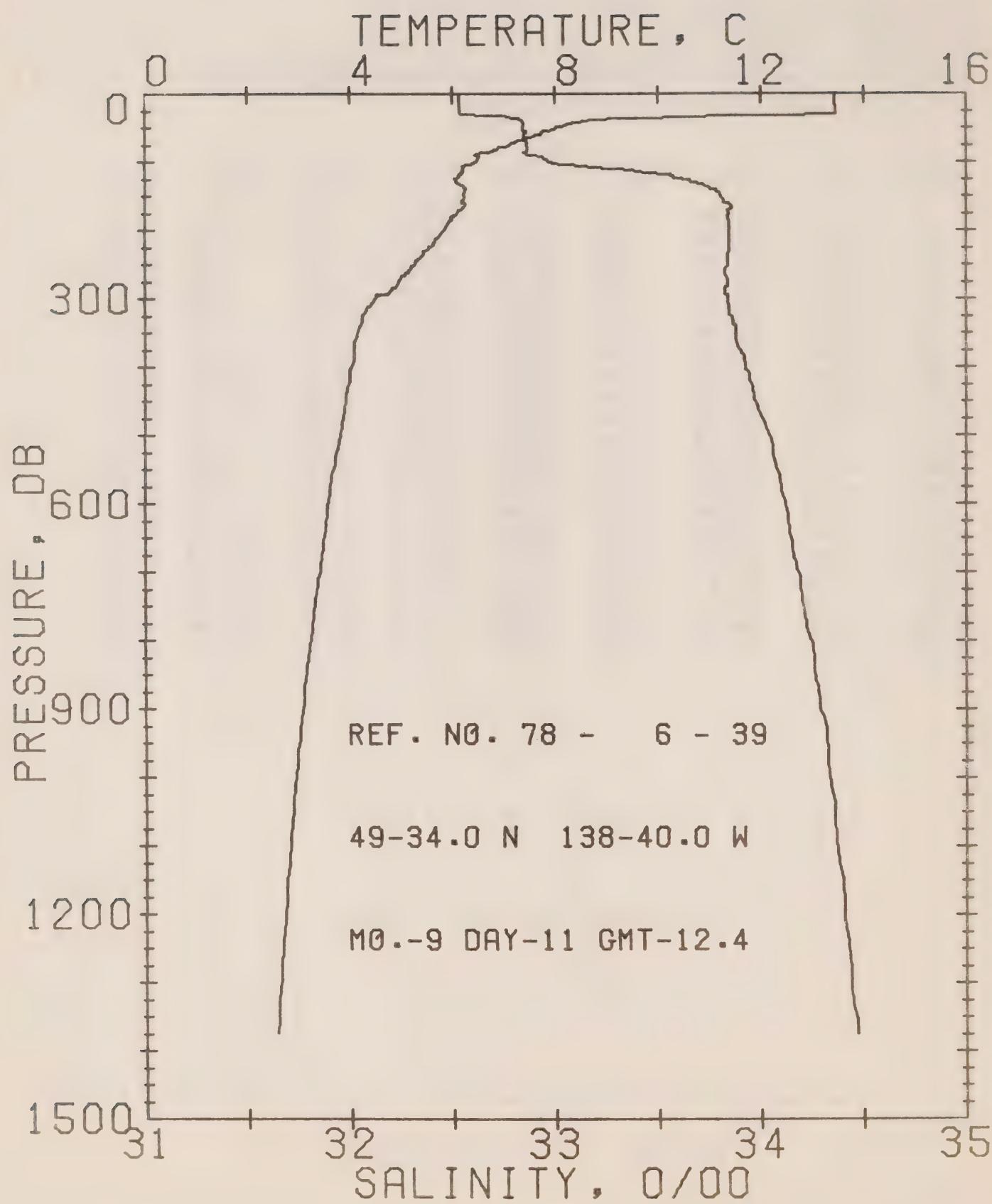
DATE 11/ 9/78

POSITION 49-41.0N, 140-40.0W GMT 5.2 STATION 11

RESULTS OF STP CAST 321 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	13.40	32.48	0	24.39	355.1	.00	.00	1499.
10	13.42	32.48	10	24.38	355.7	.36	.02	1499.
20	13.38	32.48	20	24.39	355.2	.71	.07	1499.
30	13.33	32.47	30	24.39	355.2	1.07	.16	1499.
50	7.45	32.78	50	25.63	237.1	1.58	.37	1479.
75	6.54	32.84	75	25.80	221.2	2.16	.74	1476.
100	5.98	32.92	99	25.94	208.7	2.70	1.22	1474.
125	5.91	33.53	124	26.43	162.6	3.16	1.74	1475.
150	5.80	33.79	149	26.64	142.2	3.53	2.27	1475.
175	5.50	33.83	174	26.71	136.0	3.88	2.84	1474.
200	5.24	33.83	199	26.74	133.2	4.22	3.48	1474.
225	4.99	33.83	223	26.77	130.6	4.55	4.20	1473.
250	4.69	33.83	248	26.81	127.5	4.87	4.98	1472.
300	4.19	33.84	298	26.87	121.8	5.49	6.72	1471.
400	3.96	33.90	397	26.94	115.8	6.69	11.00	1472.
500	3.85	34.01	496	27.04	107.2	7.81	16.13	1473.
600	3.66	34.11	595	27.13	98.8	8.84	21.91	1474.
800	3.38	34.26	793	27.28	86.0	10.68	34.98	1476.
1000	3.06	34.35	990	27.38	77.0	12.31	49.84	1478.
1200	2.74	34.43	1188	27.48	68.8	13.75	66.00	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 39

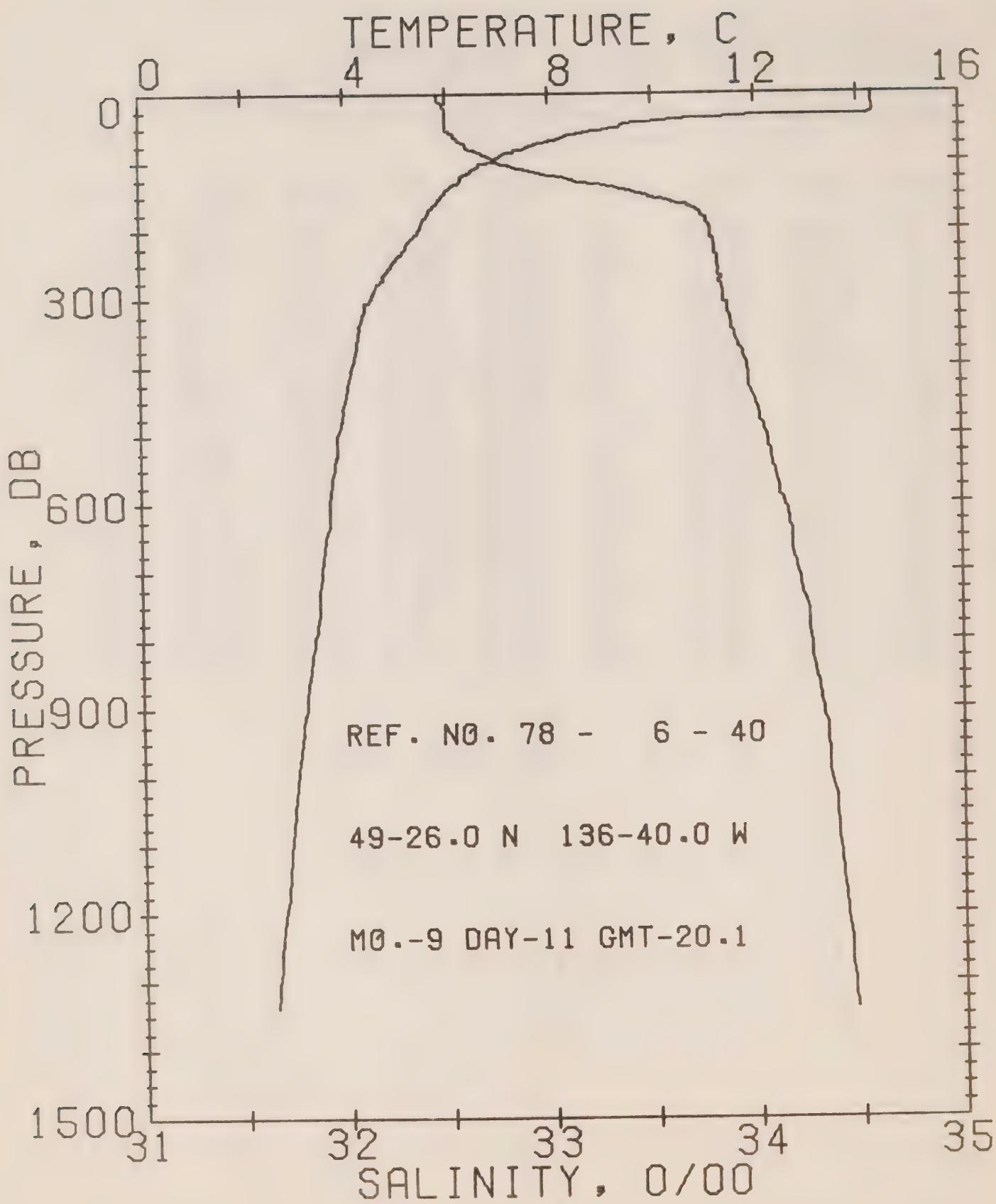
DATE 11/ 9/78

POSITION 49-34.0N, 138-40.0W GMT 12.4 STATION 10

RESULTS OF STP CAST 305 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	13.43	32.53	0	24.42	352.0	.00	.00	1499.
10	13.45	32.53	10	24.42	352.6	.35	.02	1499.
20	13.46	32.53	20	24.41	353.0	.71	.07	1500.
30	13.46	32.54	30	24.42	352.5	1.06	.16	1500.
50	8.02	32.85	50	25.61	239.7	1.58	.37	1481.
75	7.08	32.86	75	25.75	226.6	2.17	.74	1478.
100	6.44	32.98	99	25.93	209.8	2.71	1.23	1476.
125	6.04	33.61	124	26.48	157.9	3.17	1.75	1475.
150	6.23	33.81	149	26.61	146.0	3.54	2.27	1477.
175	6.09	33.85	174	26.66	141.6	3.90	2.87	1477.
200	5.82	33.85	199	26.69	138.6	4.25	3.54	1476.
225	5.55	33.85	223	26.72	135.6	4.60	4.28	1475.
250	5.26	33.84	248	26.75	133.2	4.93	5.09	1475.
300	4.47	33.84	298	26.84	124.8	5.58	6.92	1472.
400	4.02	33.93	397	26.96	114.2	6.77	11.16	1472.
500	3.81	34.04	496	27.07	104.4	7.87	16.18	1473.
600	3.56	34.12	595	27.15	96.7	8.88	21.81	1474.
800	3.22	34.24	793	27.28	85.3	10.70	34.82	1476.
1000	2.93	34.34	990	27.38	76.5	12.31	49.53	1478.
1200	2.71	34.41	1188	27.46	69.8	13.77	65.87	1480.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 40

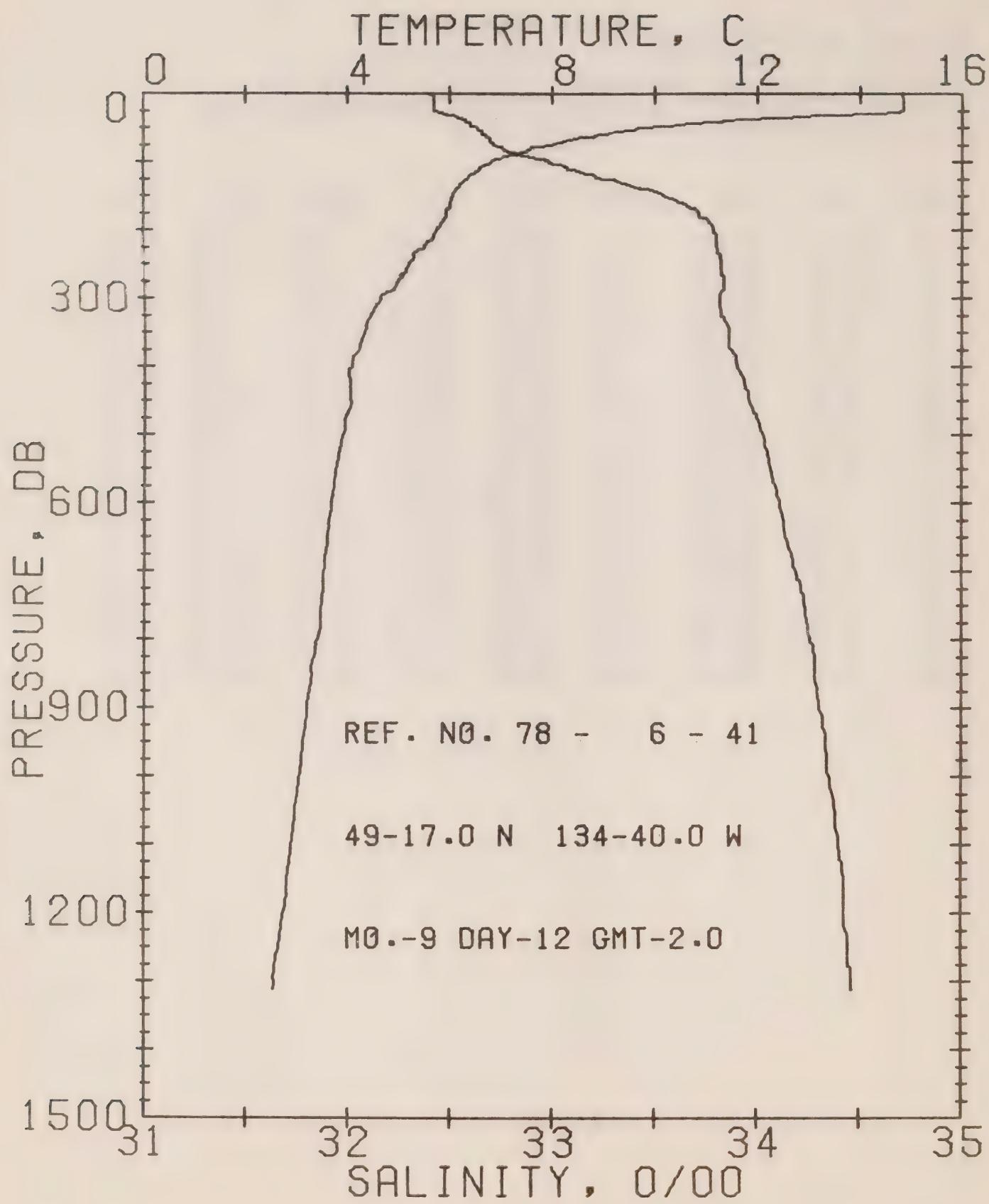
DATE 11/ 9/78

POSITION 49-26.0N, 136-40.0W GMT 20.1 STATION 9

RESULTS OF STP CAST 364 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	DELTA	POT.	SOUND
				T		D	EN	
0	14.30	32.45	0	24.18	374.8	.00	.00	1502.
10	14.30	32.46	10	24.19	374.3	.37	.02	1502.
20	14.31	32.49	20	24.21	372.6	.75	.08	1502.
30	14.30	32.50	30	24.22	371.9	1.12	.17	1503.
50	9.33	32.50	50	25.13	284.8	1.73	.42	1486.
75	7.68	32.59	75	25.45	254.7	2.40	.84	1480.
100	6.84	32.74	99	25.69	232.8	3.01	1.38	1477.
125	6.29	33.10	124	26.04	199.3	3.55	2.00	1476.
150	5.90	33.49	149	26.40	165.8	4.01	2.64	1475.
175	5.64	33.73	174	26.62	144.9	4.39	3.28	1475.
200	5.45	33.79	199	26.69	138.6	4.74	3.95	1475.
225	5.20	33.81	223	26.73	134.5	5.09	4.69	1474.
250	4.92	33.82	248	26.77	130.8	5.42	5.49	1473.
300	4.52	33.85	298	26.84	124.6	6.06	7.28	1472.
400	4.13	33.96	397	26.97	113.1	7.24	11.50	1473.
500	3.85	34.05	496	27.07	104.2	8.34	16.51	1473.
600	3.67	34.14	595	27.16	96.6	9.35	22.17	1474.
800	3.36	34.26	793	27.29	85.2	11.17	35.12	1476.
1000	3.00	34.35	991	27.39	76.1	12.77	49.79	1478.
1200	2.74	34.43	1188	27.48	68.7	14.21	65.95	1480.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 41

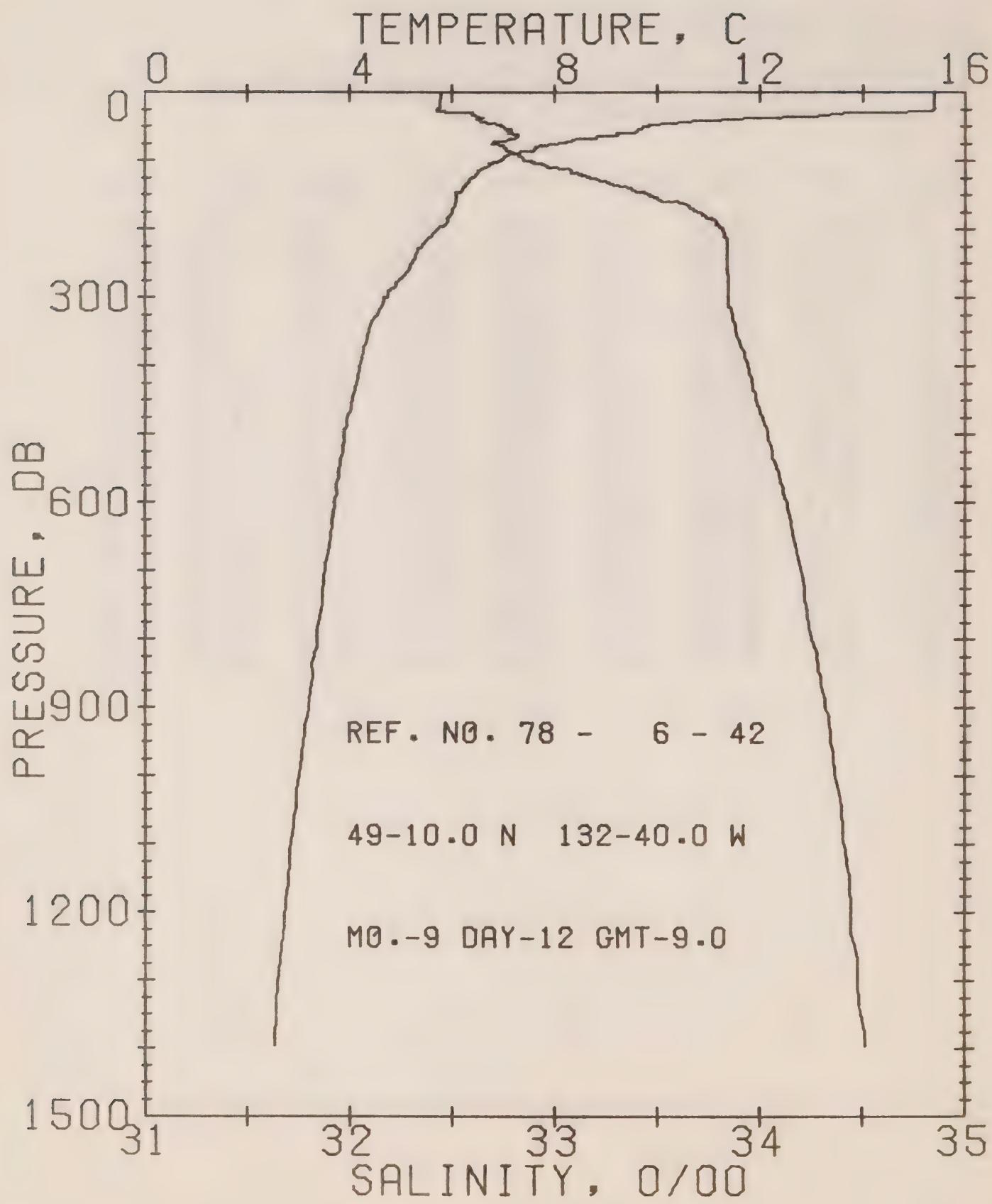
DATE 12/ 9/78

POSITION 49-17.0N, 134-40.0W GMT 2.0 STATION 8

RESULTS OF STP CAST 391 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	14.84	32.41	0	24.04	388.6	.00	.00	1504.
10	14.86	32.42	10	24.04	388.5	.39	.02	1504.
20	14.86	32.42	20	24.04	388.8	.78	.08	1504.
30	14.33	32.47	30	24.19	374.7	1.16	.18	1503.
50	9.79	32.63	50	25.16	282.2	1.80	.44	1487.
75	7.98	32.71	75	25.50	249.9	2.46	.86	1481.
100	6.79	32.98	99	25.89	213.8	3.04	1.37	1477.
125	6.33	33.24	124	26.14	189.4	3.55	1.95	1476.
150	6.04	33.54	149	26.42	163.8	3.99	2.56	1476.
175	5.93	33.71	174	26.57	150.1	4.38	3.20	1476.
200	5.73	33.79	199	26.65	142.0	4.74	3.90	1476.
225	5.50	33.80	223	26.69	138.8	5.09	4.66	1475.
250	5.19	33.83	248	26.75	133.2	5.43	5.48	1474.
300	4.63	33.82	298	26.80	128.1	6.08	7.31	1473.
400	4.06	33.91	397	26.94	116.0	7.30	11.65	1472.
500	3.89	34.03	496	27.05	106.1	8.42	16.76	1473.
600	3.69	34.11	595	27.13	98.8	9.44	22.50	1474.
800	3.38	34.26	793	27.28	85.8	11.29	35.60	1476.
1000	3.05	34.36	991	27.39	76.3	12.89	50.33	1478.
1200	2.72	34.43	1188	27.48	68.5	14.33	66.42	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 42

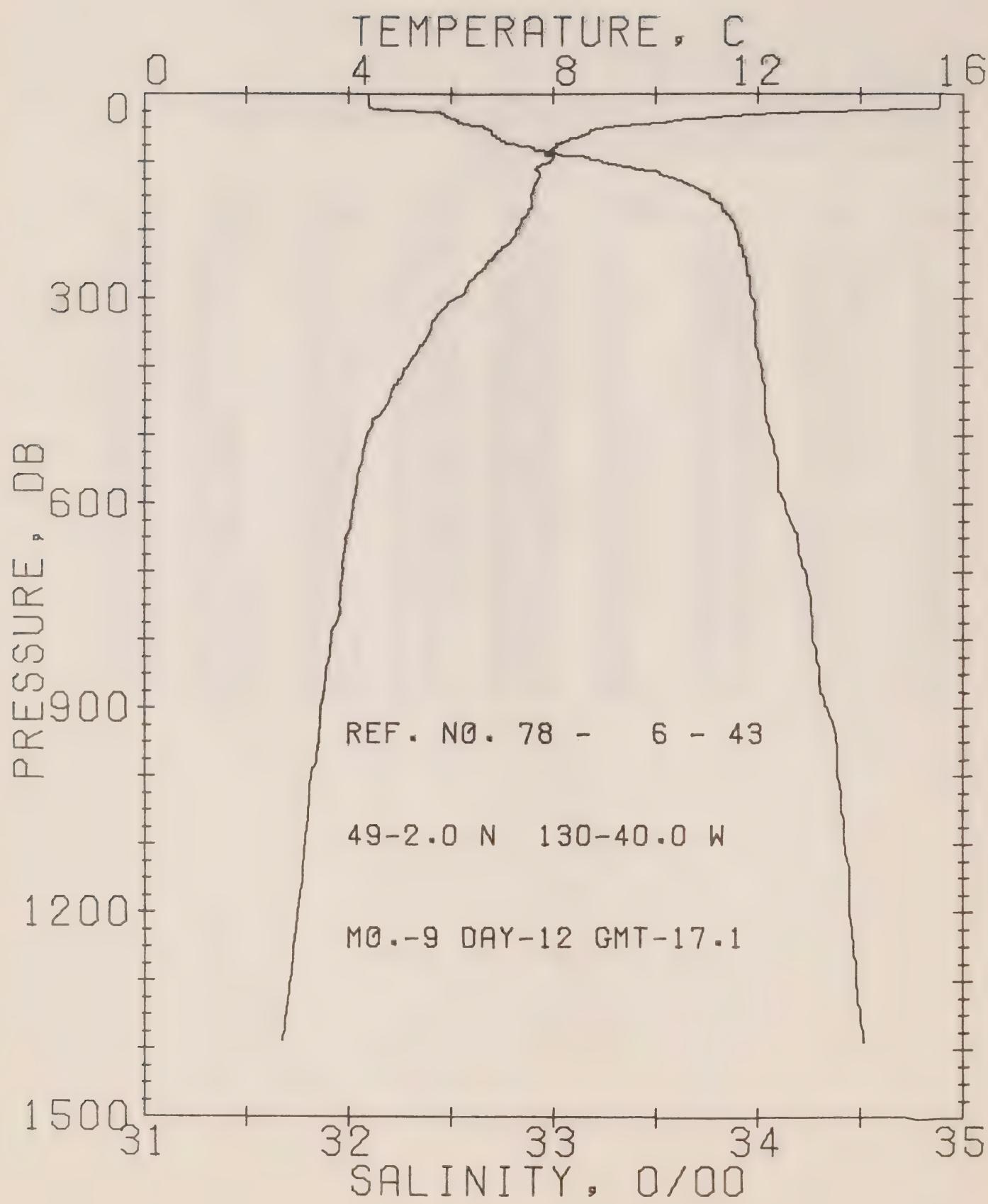
DATE 12/ 9/78

POSITION 49-10.0N, 132-40.0W GMT 9.0 STATION 7

RESULTS OF STP CAST 327 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	15.39	32.45	0	23.95	397.0	.00	.00	1506.
10	15.39	32.45	10	23.95	397.5	.40	.02	1506.
20	15.38	32.44	20	23.94	398.1	.80	.08	1506.
30	14.69	32.47	30	24.11	381.9	1.19	.18	1504.
50	9.83	32.73	50	25.23	275.5	1.82	.43	1488.
75	7.93	32.69	75	25.50	250.7	2.47	.85	1481.
100	6.91	32.89	99	25.79	222.5	3.06	1.37	1478.
125	6.38	33.17	124	26.08	195.2	3.58	1.97	1476.
150	6.08	33.46	149	26.35	170.2	4.04	2.61	1476.
175	6.01	33.70	174	26.55	151.8	4.44	3.27	1476.
200	5.71	33.82	199	26.68	139.5	4.80	3.97	1476.
225	5.41	33.84	223	26.73	134.7	5.14	4.71	1475.
250	5.19	33.84	248	26.76	132.4	5.48	5.52	1474.
300	4.74	33.85	298	26.82	127.1	6.13	7.33	1473.
400	4.20	33.94	397	26.95	115.4	7.33	11.63	1473.
500	3.89	34.04	496	27.06	105.4	8.44	16.70	1473.
600	3.72	34.13	595	27.15	97.7	9.46	22.40	1474.
800	3.36	34.25	793	27.28	86.3	11.29	35.42	1476.
1000	3.01	34.37	991	27.41	74.8	12.88	49.99	1478.
1200	2.74	34.45	1188	27.49	67.2	14.29	65.76	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 43

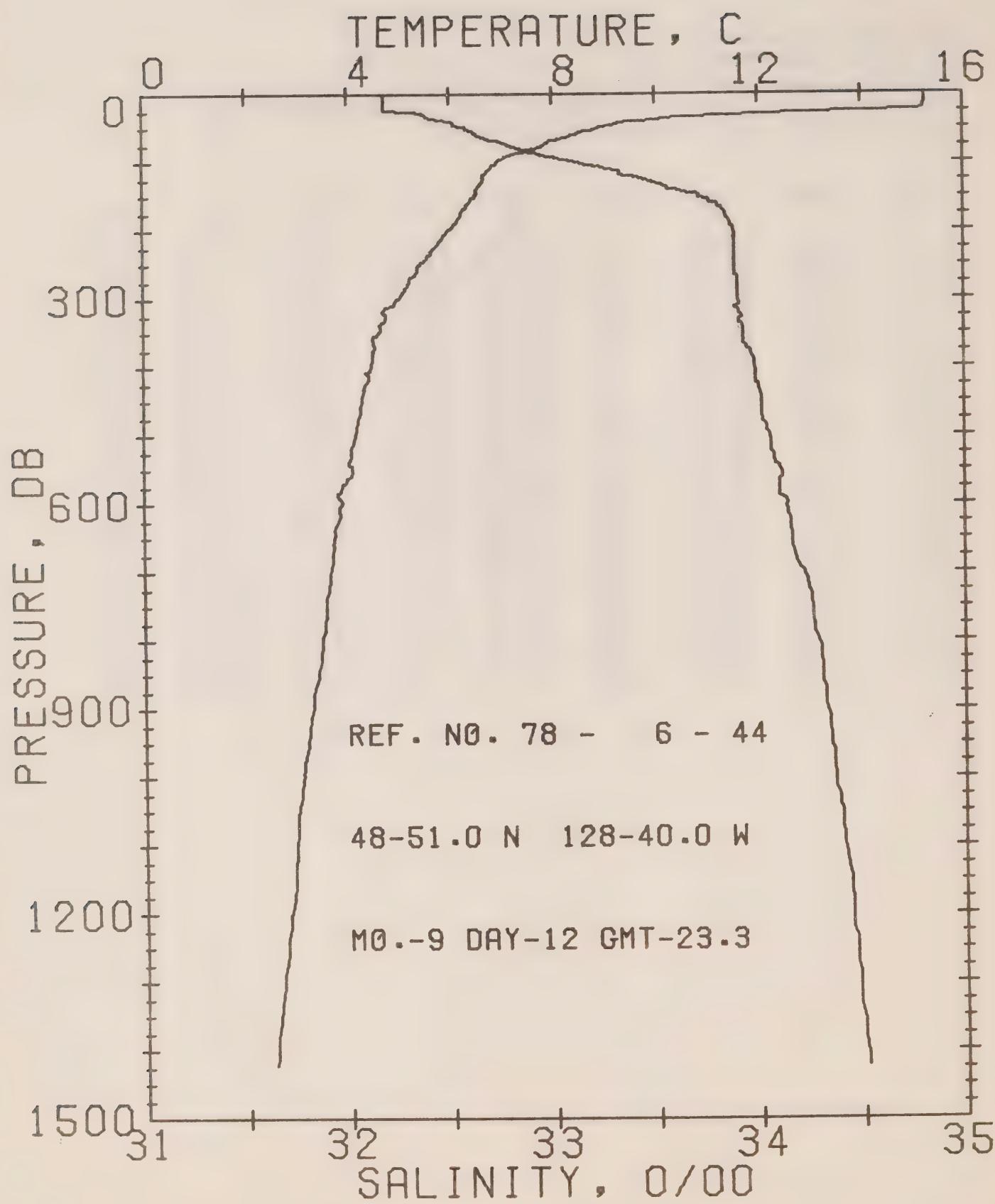
DATE 12/ 9/78

POSITION 49- 2.0N, 130-40.0W GMT 17.1 STATION 6

RESULTS OF STP CAST 378 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	15.54	32.09	0	23.64	426.4	.00	.00	1506.
10	15.55	32.09	10	23.64	426.9	.43	.02	1500.
20	15.52	32.10	20	23.65	425.8	.85	.09	1506.
30	11.99	32.47	30	24.65	330.5	1.23	.18	1495.
50	8.85	32.66	50	25.33	265.7	1.82	.42	1484.
75	8.05	32.83	75	25.59	242.0	2.46	.83	1482.
100	7.89	33.26	99	25.95	208.2	3.02	1.33	1482.
125	7.68	33.60	124	26.24	180.4	3.50	1.88	1482.
150	7.55	33.76	149	26.39	167.1	3.93	2.48	1482.
175	7.47	33.84	174	26.46	160.4	4.34	3.16	1482.
200	7.26	33.89	199	26.53	154.0	4.73	3.90	1482.
225	6.99	33.92	223	26.59	148.6	5.11	4.73	1481.
250	6.68	33.94	248	26.65	143.3	5.48	5.61	1480.
300	6.10	33.97	298	26.75	134.1	6.17	7.55	1479.
400	5.13	34.01	397	26.90	120.7	7.44	12.06	1477.
500	4.34	34.06	496	27.03	108.6	8.58	17.31	1475.
600	4.08	34.13	595	27.11	101.7	9.64	23.21	1476.
800	3.65	34.27	793	27.26	88.0	11.51	36.51	1477.
1000	3.24	34.39	991	27.40	76.0	13.14	51.43	1479.
1200	2.99	34.45	1188	27.47	70.0	14.59	67.69	1482.



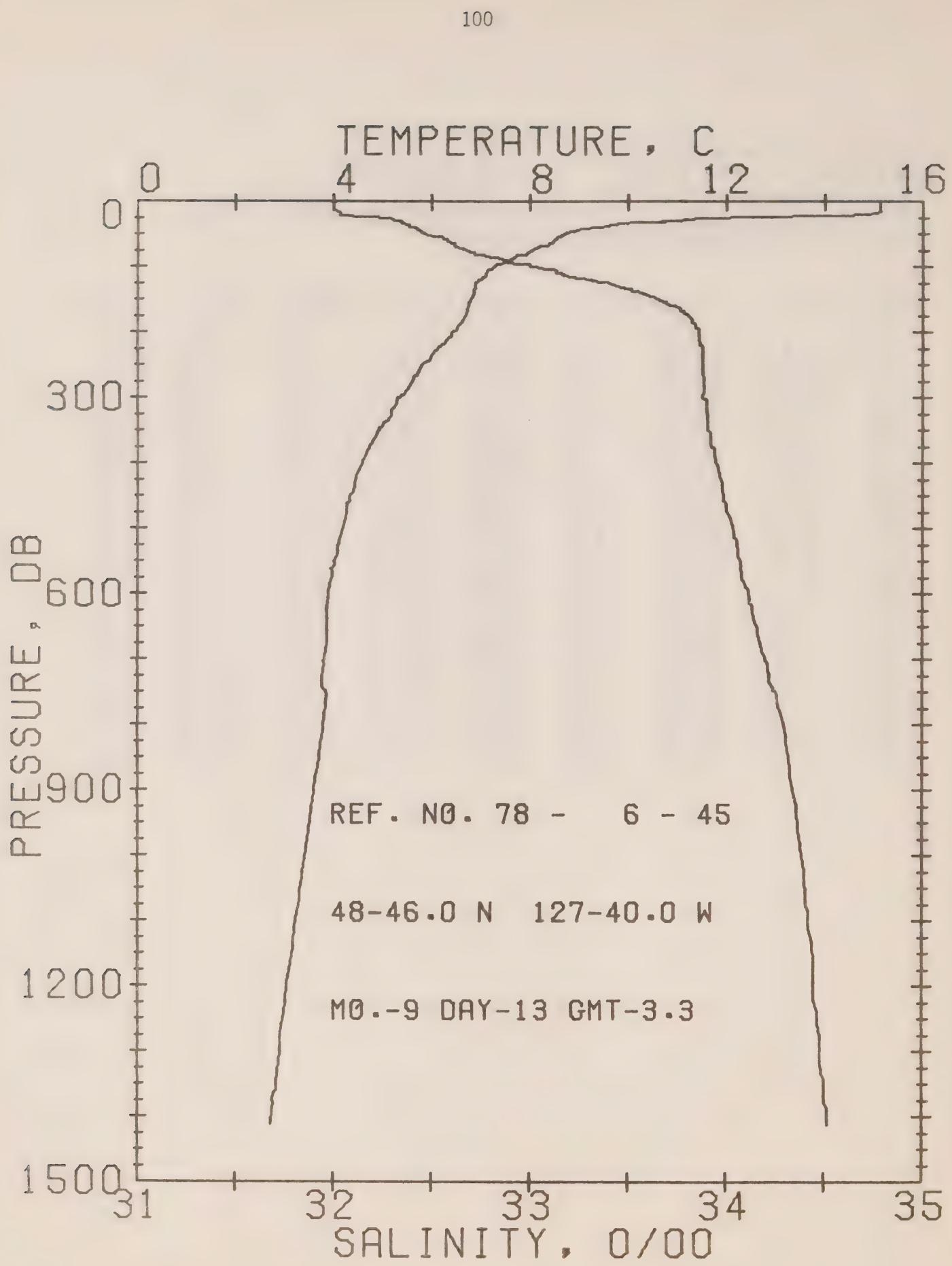
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 44

DATE 12/ 9/78

POSITION 48-51.0N, 128-40.0W GMT 23.3 STATION 5  
RESULTS OF STP CAST. 403 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	15.24	32.18	0	23.77	413.6	.00	.00	1505.
10	15.26	32.18	10	23.77	414.3	.41	.02	1505.
20	15.24	32.18	20	23.77	414.0	.83	.08	1505.
30	12.22	32.37	30	24.53	342.0	1.21	.18	1495.
50	8.89	32.57	50	25.26	272.7	1.81	.42	1484.
75	7.82	32.79	75	25.59	241.7	2.45	.83	1481.
100	6.92	33.13	99	25.98	204.7	3.01	1.33	1478.
125	6.65	33.45	124	26.27	177.8	3.49	1.88	1478.
150	6.49	33.71	149	26.49	156.6	3.91	2.46	1478.
175	6.22	33.84	174	26.63	144.0	4.28	3.08	1477.
200	5.94	33.88	199	26.70	137.8	4.64	3.75	1477.
225	5.70	33.89	223	26.74	134.5	4.98	4.49	1476.
250	5.41	33.89	248	26.77	131.2	5.31	5.29	1475.
300	4.97	33.90	298	26.83	126.0	5.95	7.09	1474.
400	4.44	33.98	397	26.95	114.8	7.15	11.37	1474.
500	4.12	34.05	496	27.04	107.2	8.26	16.47	1474.
600	3.87	34.14	595	27.14	98.5	9.30	22.25	1475.
800	3.47	34.29	793	27.30	84.6	11.13	35.29	1477.
1000	3.07	34.37	991	27.40	75.6	12.73	49.94	1478.
1200	2.81	34.45	1188	27.49	68.0	14.16	65.95	1481.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 45

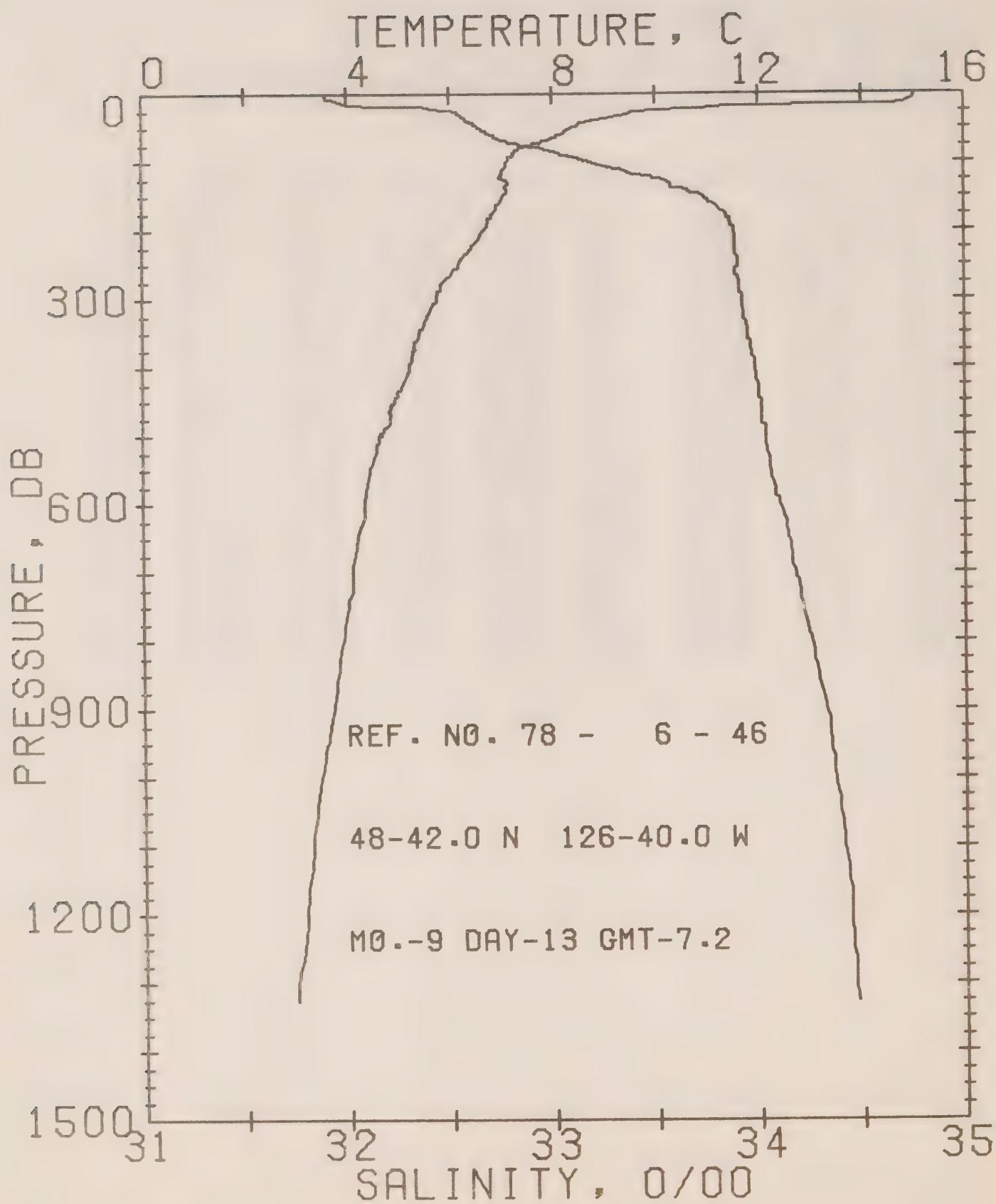
DATE 13/ 9/78

POSITION 48-46.0N, 127-40.0W GMT 3.3 STATION 4

RESULTS OF STP CAST 344 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	15.12	32.01	0	23.67	423.6	.00	.00	1504.
10	15.13	32.00	10	23.66	424.8	.42	.02	1504.
20	14.85	32.03	20	23.74	417.1	.85	.09	1504.
30	11.00	32.31	30	24.71	325.2	1.21	.18	1491.
50	8.70	32.46	50	25.20	278.3	1.79	.41	1483.
75	8.00	32.68	75	25.48	252.4	2.46	.84	1481.
100	7.26	33.01	99	25.84	218.1	3.05	1.36	1479.
125	6.88	33.39	124	26.19	184.8	3.55	1.94	1479.
150	6.79	33.65	149	26.41	165.0	3.99	2.55	1479.
175	6.68	33.81	174	26.55	152.1	4.38	3.20	1479.
200	6.42	33.86	199	26.62	145.3	4.76	3.91	1479.
225	6.12	33.88	224	26.68	140.4	5.11	4.69	1478.
250	5.79	33.88	248	26.72	136.6	5.46	5.53	1477.
300	5.33	33.88	298	26.77	131.6	6.13	7.41	1476.
400	4.57	33.95	397	26.92	118.6	7.38	11.85	1474.
500	4.19	34.03	496	27.02	109.1	8.52	17.07	1474.
600	3.89	34.11	595	27.11	101.0	9.57	22.96	1475.
800	3.79	34.29	793	27.27	87.8	11.46	36.41	1478.
1000	3.41	34.39	991	27.38	78.2	13.12	51.59	1480.
1200	3.04	34.45	1188	27.46	70.7	14.60	68.18	1482.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 46

DATE 13/ 9/78

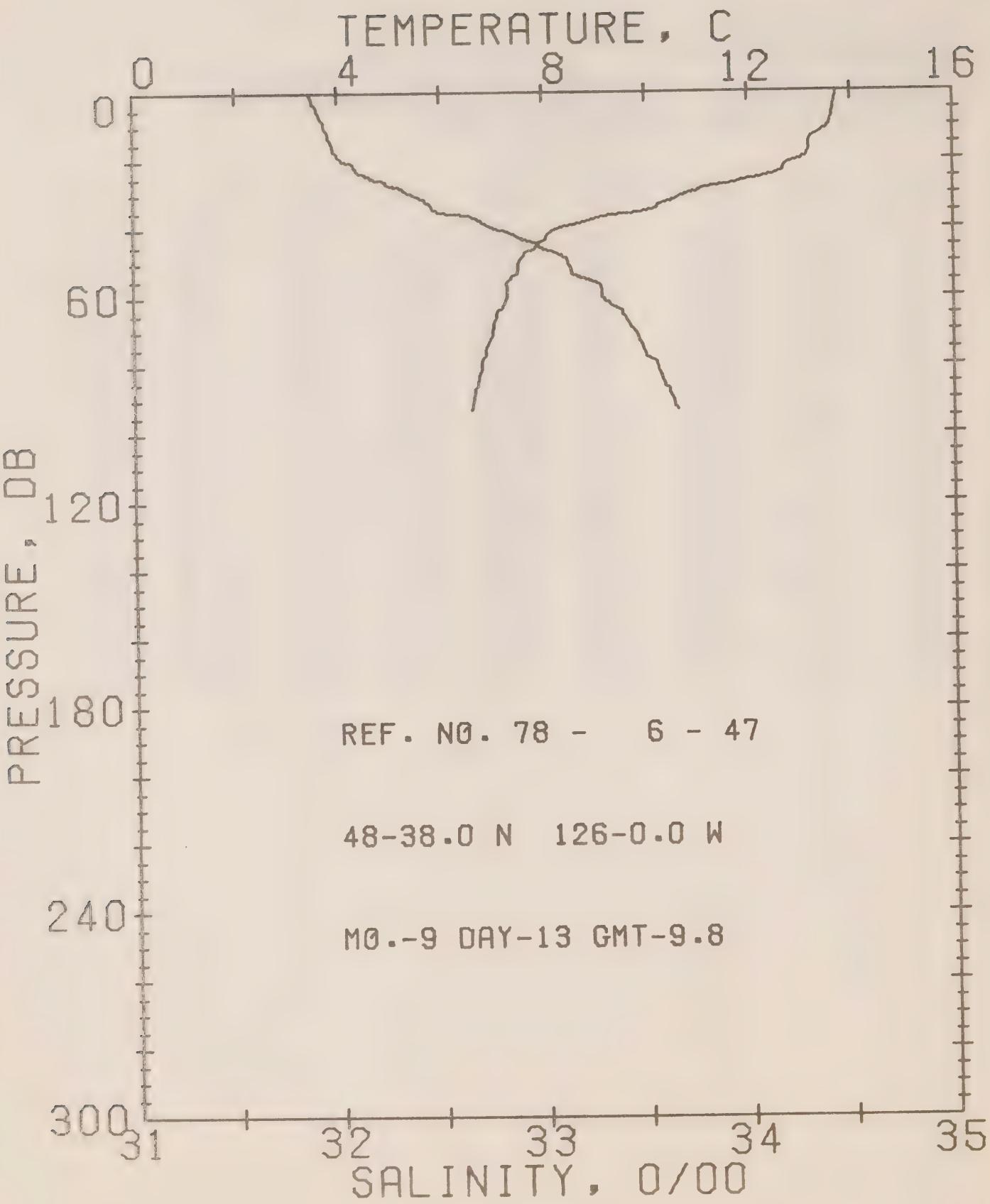
POSITION 48-42.0N, 126-40.0W GMT 7.2 STATION 3

RESULTS OF STP CAST 339 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED. PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	15.04	31.89	0	23.59	430.7	.00	.00	1504.
10	14.94	31.94	10	23.65	425.3	.43	.02	1504.
20	11.07	32.38	20	24.75	321.0	.82	.08	1491.
30	9.45	32.54	30	25.15	283.3	1.12	.16	1486.
50	8.37	32.64	50	25.39	260.2	1.66	.38	1482.
75	7.58	32.84	75	25.66	234.7	2.28	.77	1480.
100	7.10	33.18	99	26.00	203.4	2.82	1.25	1479.
125	7.05	33.52	124	26.27	177.8	3.30	1.80	1479.
150	7.03	33.72	149	26.43	162.8	3.73	2.40	1480.
175	6.84	33.84	174	26.55	151.9	4.12	3.05	1480.
200	6.63	33.88	199	26.61	146.6	4.50	3.76	1479.
225	6.41	33.89	223	26.65	143.3	4.86	4.55	1479.
250	6.17	33.90	248	26.69	139.8	5.21	5.40	1478.
300	5.73	33.92	298	26.76	133.5	5.89	7.31	1477.
400	5.20	33.98	397	26.87	123.8	7.18	11.88	1477.
500	4.62	34.03	496	26.97	114.3	8.37	17.34	1476.
600	4.32	34.10	595	27.06	106.6	9.47	23.54	1477.
800	3.89	34.25	793	27.23	92.0	11.46	37.65	1478.
1000	3.43	34.37	991	27.36	79.6	13.17	53.30	1480.
1200	3.15	34.44	1188	27.45	72.6	14.68	70.21	1482.

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## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 6- 47

DATE 13/ 9/78

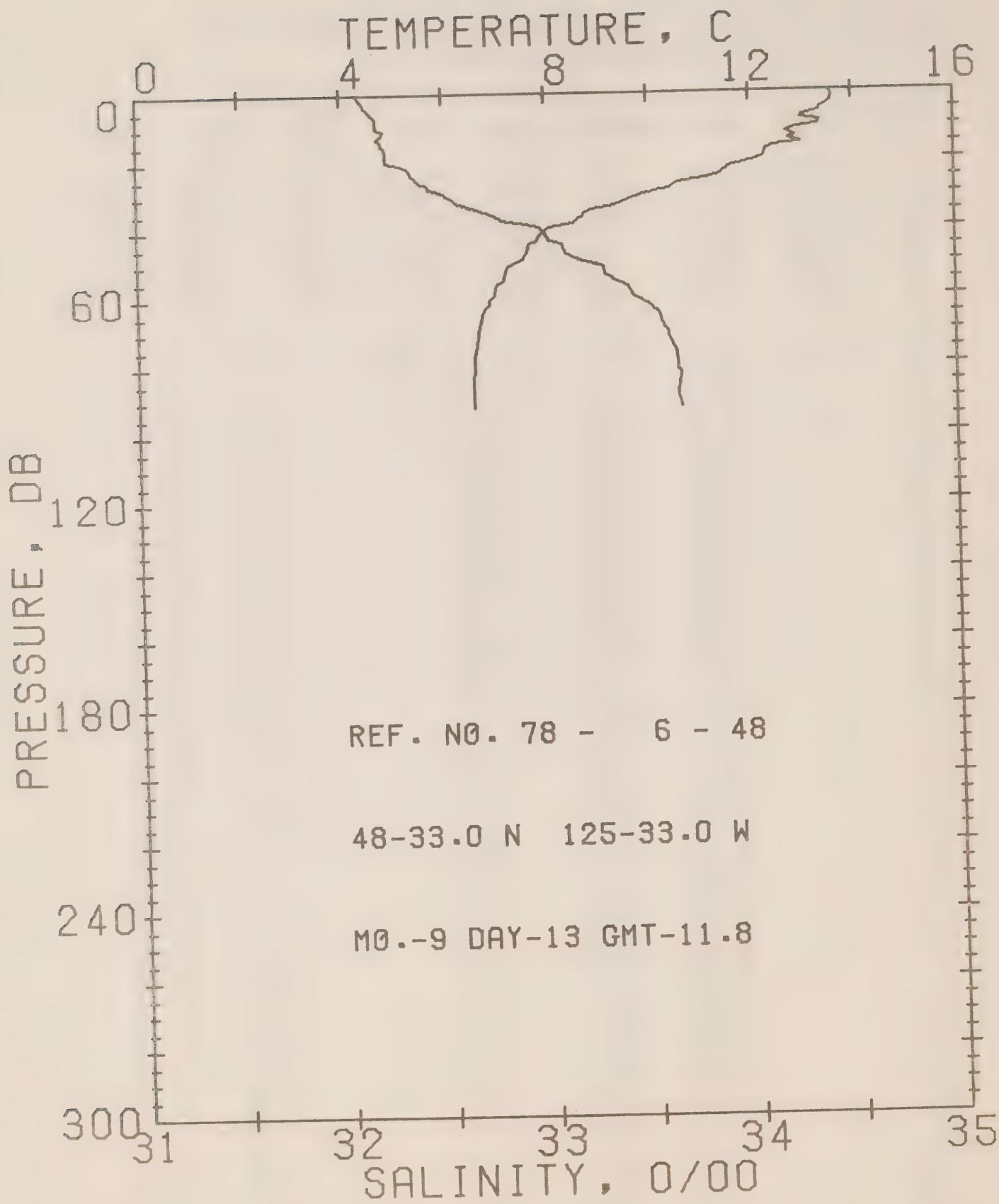
POSITION 48-38.0N, 126- .0W GMT 9.8 STATION 2

RESULTS OF STP CAST 78 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	13.73	31.86	0	23.84	406.9	.00	.00	1499.
10	13.59	31.93	10	23.93	399.3	.40	.02	1499.
20	13.03	32.02	20	24.11	382.4	.79	.08	1498.
30	10.81	32.37	30	24.79	317.6	1.15	.17	1490.
50	7.53	33.12	50	25.89	212.8	1.66	.38	1479.
75	6.89	33.49	75	26.27	177.2	2.14	.68	1478.

PRES	DEPTH	TEMP	SAL	PRES	DEPTH	TEMP	SAL
0.		13.73	31.86	45.		7.87	32.98
1.		13.73	31.87	46.		7.84	33.00
3.		13.72	31.88	47.		7.66	33.05
4.		13.69	31.89	48.		7.63	33.09
5.		13.68	31.90	49.		7.56	33.11
7.		13.66	31.91	50.		7.53	33.12
9.		13.62	31.93	52.		7.51	33.13
10.		13.59	31.93	53.		7.48	33.14
11.		13.56	31.94	54.		7.40	33.17
12.		13.44	31.95	55.		7.36	33.21
13.		13.26	31.95	56.		7.29	33.27
15.		13.21	31.97	57.		7.30	33.28
17.		13.19	31.98	58.		7.30	33.29
18.		13.18	31.99	60.		7.30	33.29
19.		13.14	32.00	61.		7.29	33.30
20.		13.03	32.02	62.		7.25	33.33
21.		12.79	32.07	63.		7.21	33.36
22.		12.73	32.08	64.		7.13	33.39
23.		12.69	32.09	65.		7.10	33.39
24.		12.57	32.13	66.		7.08	33.40
25.		12.27	32.16	67.		7.07	33.41
26.		11.90	32.23	68.		7.04	33.42
27.		11.76	32.23	69.		7.04	33.43
28.		11.18	32.31	70.		7.02	33.45
29.		11.06	32.32	71.		7.00	33.46
30.		10.81	32.37	73.		6.96	33.47
31.		10.64	32.40	74.		6.93	33.48
32.		10.51	32.43	75.		6.89	33.49
33.		10.27	32.45	77.		6.87	33.50
34.		10.25	32.46	78.		6.84	33.52
35.		9.91	32.49	79.		6.80	33.55
36.		9.33	32.63	81.		6.79	33.56
37.		8.95	32.68	83.		6.75	33.57
38.		8.83	32.70	86.		6.72	33.59
40.		8.24	32.76	87.		6.68	33.61
41.		8.17	32.83	88.		6.67	33.61
42.		8.08	32.86	90.		6.64	33.63
43.		8.05	32.90	92.		6.62	33.64
44.		7.91	32.96	93.		6.58	33.65



OFFSHORE OCEANOGRAPHY GROUP  
 REFERENCE NO. 78- 6- 48 DATE 13/ 9/78  
 POSITION 48-33.0N, 125-33.0W GMT 11.8 STATION 1  
 RESULTS OF STP CAST 71 POINTS TAKEN FROM ANALOG TRACE  
 GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	DELTA	POT.	SOUND
				T		D	EN	
0	13.58	32.07	0	24.03	388.6	.00	.00	1499.
10	13.36	32.17	10	24.16	377.3	.38	.02	1499.
20	12.15	32.22	20	24.43	351.6	.74	.07	1495.
30	9.84	32.51	30	25.06	291.5	1.06	.16	1487.
50	7.32	33.24	50	26.01	201.1	1.54	.35	1479.
75	6.62	33.62	75	26.41	164.0	1.99	.63	1477.

PRES	DEPTH	TEMP	SAL	PRES	DEPTH	TEMP	SAL
0.		13.58	32.07	39.		8.06	32.97
2.		13.63	32.10	41.		7.94	32.99
3.		13.59	32.11	42.		7.88	33.00
4.		13.56	32.12	43.		7.85	33.01
5.		13.40	32.14	44.		7.68	33.07
6.		13.38	32.15	45.		7.65	33.08
7.		13.03	32.17	47.		7.62	33.09
8.		13.02	32.17	49.		7.54	33.15
9.		13.40	32.17	50.		7.32	33.24
10.		13.36	32.17	51.		7.25	33.28
11.		12.94	32.21	53.		7.21	33.29
12.		12.72	32.20	54.		7.18	33.32
13.		12.91	32.18	55.		7.16	33.33
14.		12.77	32.19	56.		7.04	33.38
15.		13.02	32.20	57.		7.01	33.40
16.		12.45	32.21	59.		6.99	33.42
17.		12.33	32.22	61.		6.89	33.47
19.		12.29	32.22	62.		6.87	33.50
20.		12.15	32.22	63.		6.81	33.52
21.		11.90	32.29	64.		6.78	33.54
22.		11.60	32.33	65.		6.74	33.55
24.		11.43	32.35	67.		6.72	33.56
25.		11.17	32.37	69.		6.70	33.57
26.		10.74	32.38	70.		6.68	33.59
27.		10.53	32.42	71.		6.68	33.59
28.		10.44	32.43	74.		6.63	33.61
29.		10.13	32.49	76.		6.61	33.63
30.		9.84	32.51	77.		6.60	33.63
31.		9.67	32.54	79.		6.59	33.64
32.		9.48	32.56	81.		6.58	33.64
33.		9.35	32.60	82.		6.58	33.65
34.		8.91	32.66	83.		6.55	33.65
35.		8.76	32.72	88.		6.55	33.64
36.		8.71	32.75	89.		6.55	33.64
37.		8.62	32.78	92.		6.55	33.65
38.		8.55	32.87				



Surface Salinity and Temperature Observations  
(P-78-6)

SURFACE SALINITY AND TEMPERATURE OBSERVATIONS  
CRUISE REFERENCE NUMBER 78- 6

DATE/TIME				SALINITY	TEMP	LONGITUDE
YR	MO	DY	GMT		C	WEST
78	7	28	1652	0/00		
78	7	28	1817	30.511		123-30
78	7	28	1945	30.772		124- 0
78	7	28	2110	31.363		124-30
78	7	28	2110	31.925		125- 0
78	7	28	2245		11.6	125-33
78	7	28	2340	32.094	13.8	126- 0
78	7	29	130	32.213	13.6	126-40
78	7	29	415	32.092	13.2	127-40
78	7	29	645	31.950	15.1	128-40
78	7	29	930	32.367	15.0	129-40
78	7	29	1200	32.362	15.0	130-40
78	7	29	1440		14.8	131-40
78	7	29	1715	32.520	14.8	132-40
78	7	29	2000		14.3	133-40
78	7	29	2240	32.631	14.1	134-40
78	7	30	115		14.7	135-40
78	7	30	400	32.383	14.4	136-40
78	7	30	630		14.3	137-40
78	7	30	905	32.733	13.8	138-40
78	7	30	1145		13.2	139-40
78	7	30	1430	32.662	13.1	140-40
78	7	30	1710		13.3	141-40
78	7	30	1940	32.651	13.0	142-40
78	7	30	2205			143-40
78	7	31	0		12.6	144-18
78	8	1	0		12.2	145- 0
78	8	2	0	32.656	12.8	ON STATION
78	8	3	0	32.655	13.1	ON STATION
78	8	4	0	32.675	13.1	ON STATION
78	8	5	0	32.670	13.5	ON STATION
78	8	6	0	32.580	12.8	ON STATION
78	8	7	0	32.547	12.6	ON STATION
78	8	8	0	32.553	12.6	ON STATION
78	8	9	0	32.558	12.6	ON STATION
78	8	10	0	32.559	12.7	ON STATION
78	8	11	0	32.550	12.6	ON STATION
78	8	12	0	32.575	12.6	ON STATION
78	8	13	0	32.569	12.4	ON STATION
78	8	14	0	32.574	12.8	ON STATION
78	8	15	0		12.2	ON STATION
78	8	16	0	32.573	12.6	ON STATION
78	8	17	0	32.572	12.7	ON STATION
78	8	18	0	32.564	12.8	ON STATION
78	8	19	0	32.578	12.7	ON STATION

SURFACE SALINITY AND TEMPERATURE OBSERVATIONS  
CRUISE REFERENCE NUMBER 78- 6

DATE/TIME			SALINITY	TEMP	LONGITUDE	
YR	MO	DY	GMT		C	WEST
78	8	20	0	0/00	12.9	ON STATION
78	8	21	0	32.558	12.9	ON STATION
78	8	22	0	32.561	12.9	ON STATION
78	8	23	0	32.571	13.0	ON STATION
78	8	24	0	32.567	12.9	ON STATION
78	8	25	0	32.543	12.9	ON STATION
78	8	25	0	32.560	13.4	ON STATION
78	8	26	0		13.2	ON STATION
78	8	27	0	32.536	13.1	ON STATION
78	8	28	0	32.466	13.2	ON STATION
78	8	29	0	32.516	13.6	ON STATION
78	8	30	0	32.536	13.1	ON STATION
78	8	31	0	32.545	13.1	ON STATION
78	9	1	0	32.549	13.1	ON STATION
78	9	2	0	32.539	13.1	ON STATION
78	9	3	0	32.539	13.2	ON STATION
78	9	4	0	32.544	13.5	ON STATION
78	9	5	0	32.543	13.3	ON STATION
78	9	6	0	32.502	13.3	ON STATION
78	9	7	0	32.526	13.3	ON STATION
78	9	8	0	32.516	13.2	ON STATION
78	9	9	0	32.523	13.3	ON STATION
78	9	10	0		13.2	144-24
78	9	10	1600		13.0	143-40
78	9	10	2000	32.614	14.5	142-40
78	9	11	200		13.8	141-40
78	9	11	600	32.450	13.7	140-40
78	9	11	900		13.7	139-40
78	9	11	1245	32.510	13.8	138-40
78	9	11	1550		14.2	137-40
78	9	11	1900	32.461	14.8	136-40
78	9	11	2245		14.9	135-40
78	9	12	200	32.381	15.3	134-40
78	9	12	550		15.2	133-40
78	9	12	900	32.382	15.7	132-40
78	9	12	1250		16.3	131-40
78	9	12	1600	32.000	16.0	130-40
78	9	12	2000		15.9	129-40
78	9	12	2315	32.133	15.1	128-40
78	9	13	315	31.921	15.6	127-40
78	9	13	712	31.829	15.7	126-40
78	9	13	948	31.767	14.0	126- 0
78	9	13	1145	31.855	13.9	125-33
78	9	13	1345	30.315		125- 0
78	9	13	1530	30.738		124-30

SURFACE SALINITY AND TEMPERATURE OBSERVATIONS  
CRUISE REFERENCE NUMBER 78- 6

DATE/TIME YR MO DY	GMT	SALINITY	TEMP	LONGITUDE
78 9 13	1700	0/00	C	WEST
78 9 13	1830	31.208		124- 0
		30.761		123-30

\* DENOTES SALINITY SAMPLE TAKEN FROM A  
BUCKET. ALL OTHER SAMPLES TAKEN FROM  
THE SEAWATER LOOP

LIST OF OMISSIONSHydrographic data

There were no hydrographic casts.

STP data

There were no omissions.







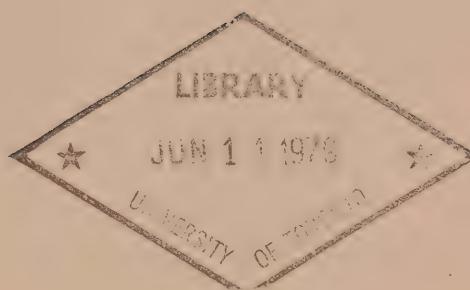
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EP 321  
-79 R08

Government  
Publications

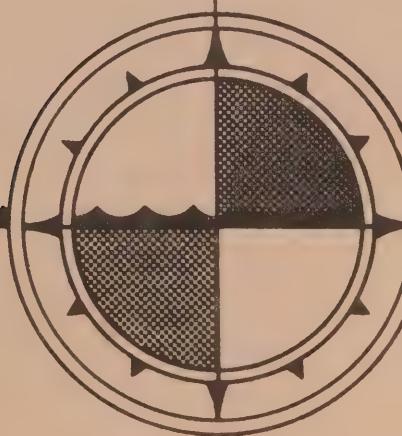
# OCEANOGRAPHIC OBSERVATIONS AT OCEAN STATION P

8 September - 26 October 1978

Volume 94



INSTITUTE OF OCEAN SCIENCES, PATRICIA BAY  
Sidney, B.C.



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OCEANOGRAPHIC OBSERVATIONS AT OCEAN STATION P

8 September - 26 October 1978

Volume 94

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### ABSTRACT

Physical, chemical and biological oceanographic observations are made from the weathership at Ocean Weather Station Papa, and between Esquimalt and Station Papa, on a routine continuing basis. Physical oceanography data only are shown, including surface observations and profiles obtained with bottle casts and conductivity-temperature-pressure instruments.



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## INTRODUCTION

Canadian operation of Ocean Weather Station P (Latitude  $50^{\circ}00' N$ , Longitude  $145^{\circ}00' W$ ) was inaugurated in December, 1950. The station is occupied primarily to make meteorological observations of the surface and upper air and to provide an air-sea rescue service. The station is manned by two vessels operated by the Marine Services Branch of the Ministry of Transport. They are the CCGS Vancouver and the CCGS Quadra. Each ship remains on station for a period of six weeks, and is then relieved by the alternate ship, thus maintaining a continuous watch.

Bathythermograph observations have been made at Station P since July 1952. A program of more extensive oceanographic observations commenced in August 1956. This was extended in April 1959, by the addition of a series of oceanographic stations along the route to and from Station P and Swiftsure Bank. These stations are known as Line P stations. The number of stations on Line P has been increased twice and now consists of twelve stations (Fig 1). Bathymeterograph observations and surface salinity sample collections, in addition to being made on Line P oceanographic stations, are also made at odd meridians at  $40'$ , i.e.  $139^{\circ}40' W$ ,  $141^{\circ}40' W$ , etc. These stations are known as Line P BT stations. Data observed prior to 1968 have been indexed by Collins et al (1969).

The present record includes hydrographic, continuously sampled STD and surface salinity and temperature data collected from the CCGS Quadra during the period 8 September to 26 October 1978.

All physical oceanographic data have been stored by the Marine Environmental Data Services Branch (MEDS), Department of Fisheries and Oceans, 240 Sparks Street, 7<sup>th</sup> Floor West, Ottawa, Ontario, Canada, K1A 0E6. Requests for these data should be directed to MEDS.

Biological and productivity data are published in the Manuscript Report series of the Department of Fisheries and Oceans (DFO), Pacific Biological Station, Nanaimo, British Columbia, Canada. Requests for these data should be directed to DFO.

Marine geochemical data are for the Ocean Chemistry Division, Department of Fisheries and Oceans, Institute of Ocean Sciences, P.O. Box 6000, Sidney, B.C., Canada, V8L 4B2.

PROGRAM OF OBSERVATION FROM CCGS QUADRA, 8 SEPTEMBER - 26 OCTOBER 1978 (P-78-7)  
(MEDS Ref. No. 15-78-007)

Oceanographic observations were made by Mr. T. Juhasz.

En Route to Station P

Line P Stations 1,7,8,10,11 were occupied and an STD profile made to near bottom or 1500 metres. Hydrocasts were made at Stations 7 and 11 to 1500 metres. Rough weather cancelled work on other stations.

Mechanical BT's or XBT's were taken at all whole or half stations.

Samples for nitrates and nutrients were collected from all whole stations (except station 6) from the seawater loop. Loop salinities were collected at all whole and half stations (except station 6). A bucket salinity sample was collected at station 1. Surface bucket temperatures were taken at stations 1,7,8,10, and 11.

A surface tarball tow was completed at Station 8.

The thermosalinograph, surface temperature recorder and PCO<sub>2</sub> system were run continuously.

On Station P

The oceanographic program was carried out as follows:

Physical Oceanography:

- 1) Profiles for salinity, temperature and oxygen were obtained from 2 hydrocasts to 4200 metres and 4 hydrocasts to 1500 metres. These major casts were accompanied by 1425 metre STD's.
- 2) A daily STD was taken to 300 metres and twice weekly to 1425 metres, when conditions allowed.
- 3) BT's were taken every 3 hours to coincide with meteorological observations and encoded and transmitted according to the IGOSS format. XBT's were taken on days of rough weather.
- 4) Surface bucket temperatures and seawater loop salinities were collected daily at 0000 hrs GMT. An additional surface bucket temperature reading was taken daily at 1700 hrs GMT.
- 5) The surface temperature recorder and thermosalinograph were run and marked daily from 1700 hrs GMT to approximately  $\frac{1}{2}$  hour after termination of hydrographic work.
- 6) Fourteen extra STD profiles were obtained to 300 metres from triangle grids set up by Cruise 15-77-006 as part of the MILE program.

Marine Geochemistry:

- 1) Two oxygen profiles to 4200 metres and four oxygen profiles to 1500 metres. One alkalinity profile to 4000 metres and one alkalinity profile to 500 metres, as well as three seawater loop samples.
- 2) One total CO<sub>2</sub> profile to 500 metres and three seawater loop samples.
- 3) Two nutrient profiles to 500 metres and a surface seawater loop sample every third day while occupying Station P.
- 4) One tritium profile to 500 metres accompanied by a surface bucket sample and a rainwater sample collected on the first possible occasion.
- 5) One seawater C-14 profile to 500 metres and three seawater loop samples taken biweekly. One seawater C-13 profile to 500 metres and three seawater loop were taken biweekly, accompanying the seawater C-14 sampling programme.
- 6) Three 5 litre air C-13 samples (in duplicate) were taken accompanying the seawater loop C-14 samples
- 7) Air CO<sub>2</sub> samples were taken in quadruplicate on Sundays and in duplicate on Thursdays. A 5 litre sample was also collected on Sundays.
- 8) PCO<sub>2</sub> carboys were filled in duplicate each week.
- 9) Six surface tarball tows were completed.
- 10) Two bottle samples were collected for trace hydrocarbons.
- 11) Two particulate organic carbon and nitrogen profiles to 1500 metres were taken. A 5 litre filtered seawater surface sample was taken once a week.
- 12) Ten Pb-210 rainwater samples were collected.
- 13) Two 30 litre alkalinity standard seawater samples were taken at 3000 metres and 3100 metres.

Biological Oceanography:

- 1) Thirty-one 150 metre vertical plankton hauls were collected.
- 2) Six Secchi disc readings taken at local noon
- 3) Two profiles to 75 metres and weekly surface samples for chlorophyll a were obtained.
- 4) Six nitrate samples were taken from the seawater loop.

### En Route from Station P

One STD to 1425 metres was completed at Station 12. One hydrocast to 1500 metres was completed at Station 12. All other hydrographic work along Line P was cancelled due to the critical condition of a sick seaman.

Two BT's were taken at Stations 12½ and 12, all whole and half stations were occupied by XBT's.

Samples for nutrients and nitrates were collected at all whole stations from the seawater loop. Loop salinity samples were collected at all whole and half stations. A surface bucket temperature reading was taken at Station 12.

A surface tarball tow was made at Station 12.

The surface temperature recorder and thermosalinograph were run continuously.

### Observations for Other Agencies

- 1) Nine satellite tracked drifting buoys were launched 28/09/78 for the Station Papa Wind Effect Experiment.
- 2) Marine mammal observations were made by the ship's officers for Mr. I. McAskie, Department of Fisheries and Oceans, Pacific Biological Station, Nanaimo, British Columbia, Canada.
- 3) Bird observations were made by the ship's officers for Dr. M. Myres, University of Alberta, Calgary, Alberta, Canada and Mr. J. Guiguet, Curator of Birds and Mammals, Provincial Museum, Department of Provincial Secretary and Travel Industry, Victoria, British Columbia, Canada.
- 4) Air CO<sub>2</sub> samples were taken weekly in duplicate for Scripps Institution of Oceanography, La Jolla, California, U.S.A.

### OBSERVATIONAL PROCEDURES

Observations for salinity, oxygen and temperature from all hydrographic casts, including the surface, were obtained with Niskin water sample bottles equipped with either Richter and Wiese and/or Yoshino Keiki Co. reversing thermometers. Two protected thermometers were used on all bottles and one unprotected thermometer was used on each bottle at depths of 300 metres or greater. The accuracy of protected reversing thermometers is believed to be ±0.02°C.

The daily surface water temperatures were measured from a bucket sample using a deck thermometer of ±0.1°C accuracy. The daily surface salinity samples were obtained from the seawater loop. When the seawater loop was not operational these samples were obtained with a bucket, and are indicated with a 'b' in this data record.

Salinity determinations were made aboard ship with either an Autolab Model 601 Mark III inductive salinometer or a Hytech Model 6220 lab salinometer. Accuracy using duplicate determinations is estimated to be  $\pm 0.003\%$ .

Depth determination were made using the "depth difference" method described in the U.S.N. Hydrographic Office Publication No. 607 (1955). Depth estimates have an approximate accuracy of  $\pm 5$  metres for depths less than 1000 metres, and  $\pm 0.5\%$  of depth for depths greater than 1000 metres.

The dissolved oxygen analyses were done in shipboard laboratory by a modified Winkler method (Carpenter, 1955).

Line P engine intake continuous temperature on both ships was recorded by a Honeywell Electronik 15 Recorder. The temperature probe is at a depth of approximately 3 metres below the sea surface and the instrument accuracy is believed to be  $\pm 0.1^{\circ}\text{C}$ .

Each ship is equipped with a Plessey Model 6600-T thermosalinograph which is used, on Line P, for continuous recording of surface temperatures and salinities from the ship's seawater loop. The temperature probe is mounted at the seawater loop intake (approximately 3 metres below the surface) and the salinity probe and recorder are situated in the dry lab. The accuracy of this instrument is believed to be  $\pm 0.1^{\circ}\text{C}$  for temperature and  $\pm 0.1\%$  for salinity.

STP profiles were taken with a Guildline Model 8700 STP system.

#### COMPUTATIONS

All hydrographic data were processed with the aid of a UNIVAC 1100 computer. Reversing thermometer temperature corrections, thermometric depth calculations and accepted depth from the "depth difference" method were computed. Extraneous thermometric depths caused by thermometer malfunctions were automatically edited and replaced. A Calcomp 565 Offline Plotter was used to plot temperature-salinity and temperature-oxygen diagrams, as well as plots of temperature, salinity and dissolved oxygen vs  $\log_{10}$  depth. These plots were used to check the data for errors.

Missing hydrographic data were obtained using a weighted parabolas interpolation method (Reiniger and Ross, 1968). These data are indicated with an asterisk in this record.

Data values which we suspect but which we have included in this data record are indicated with a plus. These data have been removed from punch card and magnetic tape records.

Analog records from the salinity-temperature-pressure instrument have been machine digitized, then replotted using the Calcomp plotter.

Digitization was continued until original and computer plotted traces were coincident. Temperature and salinity values were listed at standard pressure; integrals (depths, geopotential anomaly, and potential energy anomaly) were computed from the entire array of digitized data.

The headings for the data listings are explained as follows:

PRESS	is pressure (decibars)
TEMP	is temperature (degrees Celsius)
SAL	is salinity (parts per thousand)
DEPTH	is reported in metres
SIGMA-T	is specific gravity anomaly
SVA	is specific volume anomaly
THETA	is potential temperature (degrees Celsius)
SVA (THETA)	is potential specific volume anomaly
DELTA D	is geopotential anomaly (J/kg)
POT EN	is potential energy in units of $10^8$ ergs/cm <sup>2</sup>
OXY	is the concentration of dissolved oxygen expressed in millilitres per litre
SOUND	is the velocity of sound in m/sec

Data were processed for publication by Interact Computing Services Ltd.

#### REFERENCES

Carpenter, J.H., 1965. The Chesapeake Bay Institute technique for the Winkler dissolved oxygen method. Limnol. and Oceanogr. 10, 141-143.

Collins, C.A., R.L. Tripe, D.A. Healey and J. Joergensen, 1969. The time distribution of serial oceanographic data from the Ocean Station P programme. Fish. Res. Bd. Can. Tech. Rept. No. 106.

MacNeill, M., 1977. A study of anomalous salinity and oxygen values in the deep water at Ocean Station P from 1960-1976 (unpublished manuscript). Pacific Marine Science Report 77-9

Reiniger, R.F. and C.K. Ross, 1968. A method of interpolation with application to oceanographic data. Deep Sea Res. 15, 185-193.

U.S.N. Hydrographic Office, 1955. Instruction Manual for oceanographic observations. Publ. No. 607.

## LOG OF HYDROGRAPHIC AND STD OBSERVATIONS

Consec #	Stations	Date (Z)	Time (Z)	STD (m)	Hydrocast (m)	Comments
001	1	08/09/78	2110	73		
002	7	09/09/78	1750	1200		
003	7	09/09/78	1905		1470	T,S
004	8	10/09/78	0210	1200		
005	10	10/09/78	1935	1200		
006	11	11/09/78	0210	1200		
007	11	11/09/78	0320		1480	T,S
008	P	13/09/78	1810	250		
009	P	13/09/78	1900		1490	T,S,nutrient tritium,P.O.C.
010	P	16/09/78	1920	1200		
011	P	16/09/78	1930		4095	T,S,O <sub>2</sub> ,alk.
012	P	17/09/78	1700	250		
013	P	18/09/78	1700	250		
014	P	18/09/78	1820		0	T,S,P.O.C.
015	P	19/09/78	0030		3100	T,S,alk std.
016	P	19/09/78	1940	1200		
017	P	19/09/78	1920		1500	T,S,O <sub>2</sub>
018	P	20/09/78	1700	250		
019	P	20/09/78	1730		75	chlor-a
020	P	21/09/78	1700	250		
021	P	21/09/78	1750		1460	T,S,P.O.C.
027	P	22/09/78	1700	1200		
028	E3	22/09/78	2000	250		
029	E4	22/09/78	2110	250		
030	C1	22/09/78	2230	250		
031	W4	23/09/78	0045	250		
032	W3	23/09/78	0230	250		
033	P	23/09/78	1700	250		
034	P	23/09/78	1745		500	T,S,C-14,C-13 alk.,Tot CO <sub>2</sub>
035	P	24/09/78	1700	250		
036	P	24/09/78	1730		400	T,S,C-14,C-13 alk.,Tot CO <sub>2</sub>
037	P	25/09/78	1700	1200		
038	P	25/09/78	1940		1480	T,S,O <sub>2</sub>
039	P	26/09/78	1700	250		
040	P	26/09/78	1730		0	T,S,P.O.C.
041	P	27/09/78	1700	250		
042	P	28/09/78	1700	1200		
043	P	29/09/78	1700	250		
044	P	29/09/78	1745		300	T,S,C-14,C-13 alk.,Tot CO <sub>2</sub>
045	P	30/09/78	1700	250		
046	E3	30/09/78	1820	250		
047	E4	30/09/78	1945	250		
048	C1	30/09/78	2055	250		
049	W4	30/09/78	2205	250		
050	P	03/10/78	1700	250		
051	P	03/10/78	1830		3760	T,S,O <sub>2</sub>
052	P	04/10/78	1700	250		

LOG OF HYDROGRAPHIC AND STD OBSERVATIONS (continued)

Consec #	Stations	Date (Z)	Time (Z)	STD (m)	Hydrocast (m)	Comments
053	P	04/10/78	1725		0	T,S,P.O.C.
054	P	05/10/78	1700	250		
055	P	05/10/78	1730		75	chlor-a
056	P	06/10/78	1700	1200		
057	P	06/10/78	1800		470	T,S,nutrient
058	P	08/10/78	1700	250		
059	P	09/10/78	1700	1200		
060	P	09/10/78	1820		1470	T,S,O <sub>2</sub>
061	P	10/10/78	1700	250		
062	P	11/10/78	1700	250		
063	E3	11/10/78	1815	250		
064	E4	11/10/78	1935	250		
065	C1	11/10/78	2050	250		
066	W4	11/10/78	2155	250		
067	W3	11/10/78	2300	250		
068	P	12/10/78	1700	250		
069	P	12/10/78	1800		1480	T,S,P.O.C.
075	P	15/10/78	1700	250		
076	P	15/10/78	1755		200	T,S,C-14,C-13 alk.,Tot CO <sub>2</sub>
077	P	16/10/78	1700	1200		
078	P	16/10/78	1810		1420	T,S,O <sub>2</sub>
079	P	17/10/78	1700	250		
080	P	17/10/78	1720		0	T,S,O <sub>2</sub>
081	P	18/10/78	1700	250		
082	P	19/10/78	1700	1200		
083	P	20/10/78	1700	250		
084	P	20/10/78	1720		100	T,S,C-14,C-13 alk.,Tot CO <sub>2</sub>
085	P	21/10/78	1700	250		
086	12	22/10/78	1710	1200		
087	12	22/10/78	1830		1460	T,S

Note: P.O.C. = particulate organic carbon

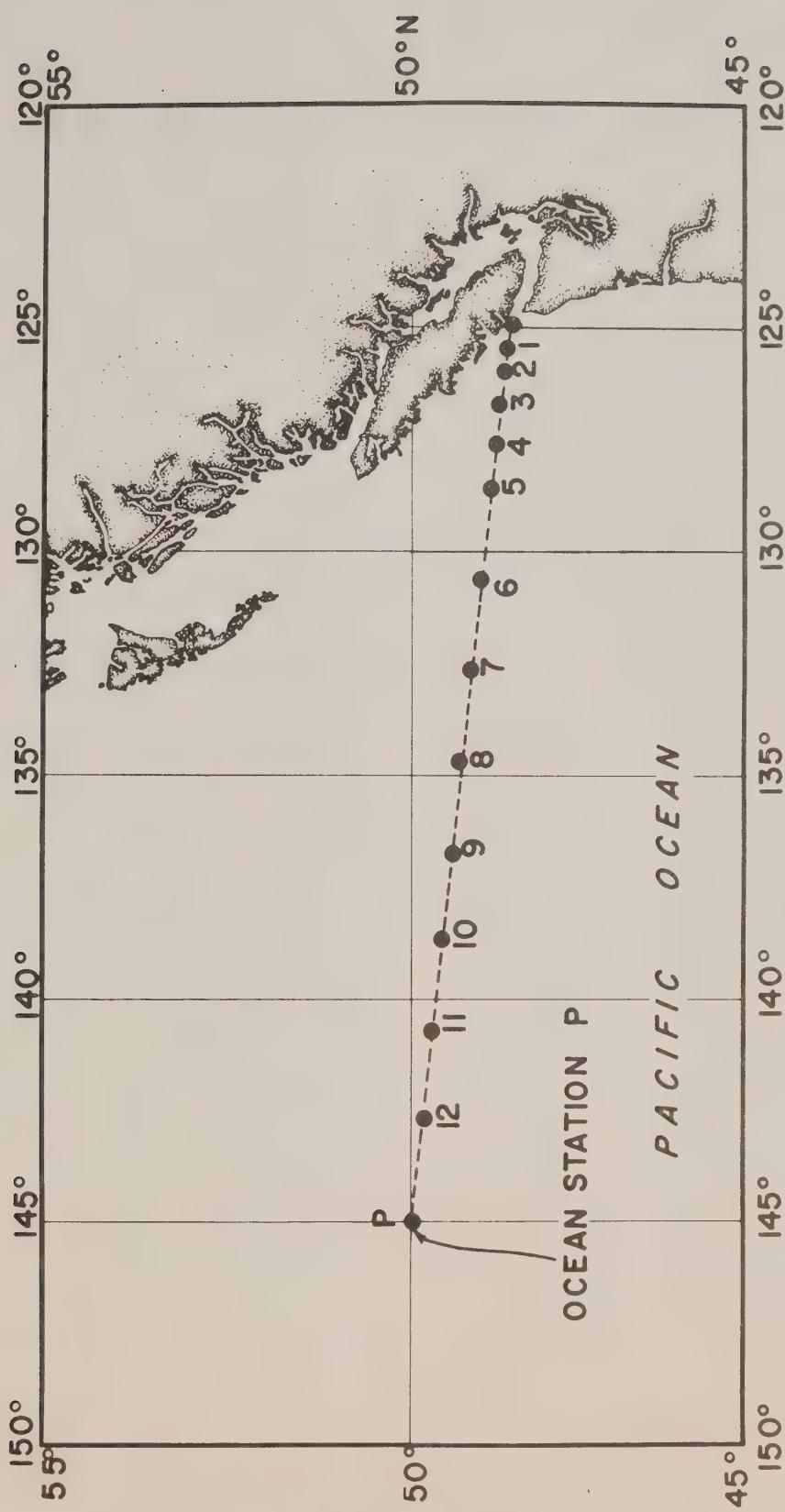


Fig. 1 Chart showing Line P station positions.



Oceanographic Data Obtained on Cruise P-78-7  
(MEDS Reference NO. 15-78-007)



Results of Hydrographic Observations

(P-78-7)

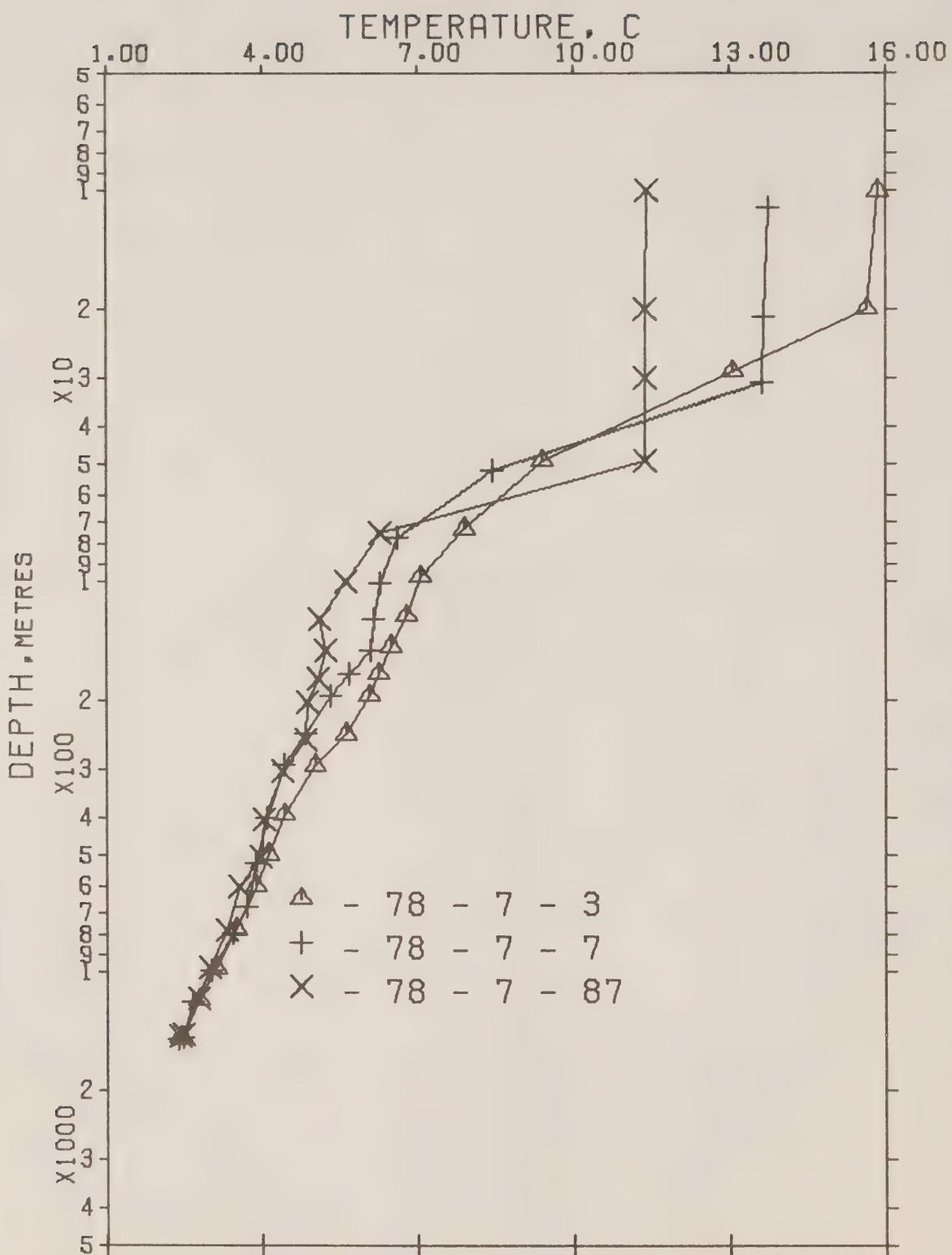


Figure 2. Composite plot of temperature vs  $\log_{10}$  depth for Line P Stations.

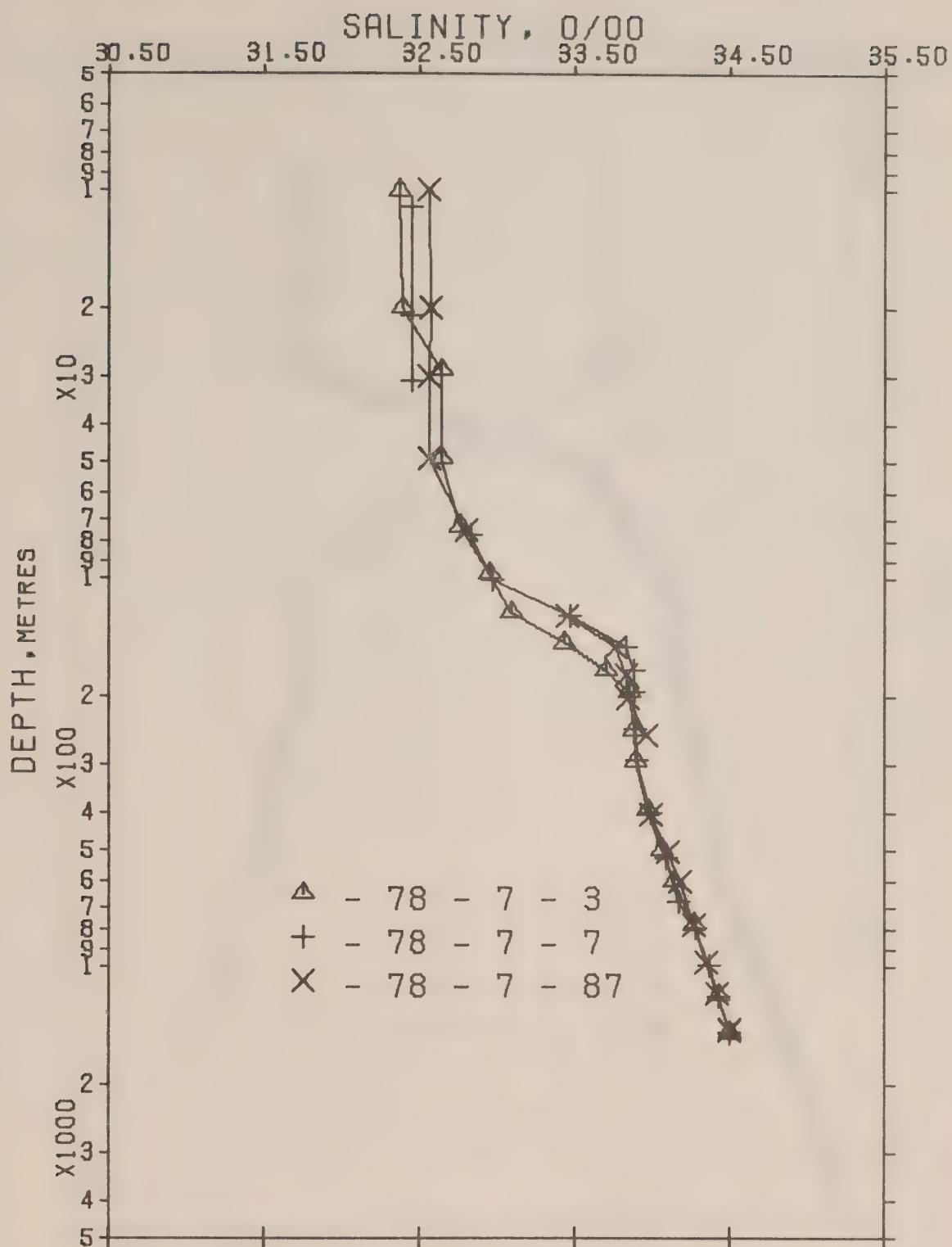


Figure 3. Composite plot of salinity vs  $\log_{10}$  depth for Line P Stations.

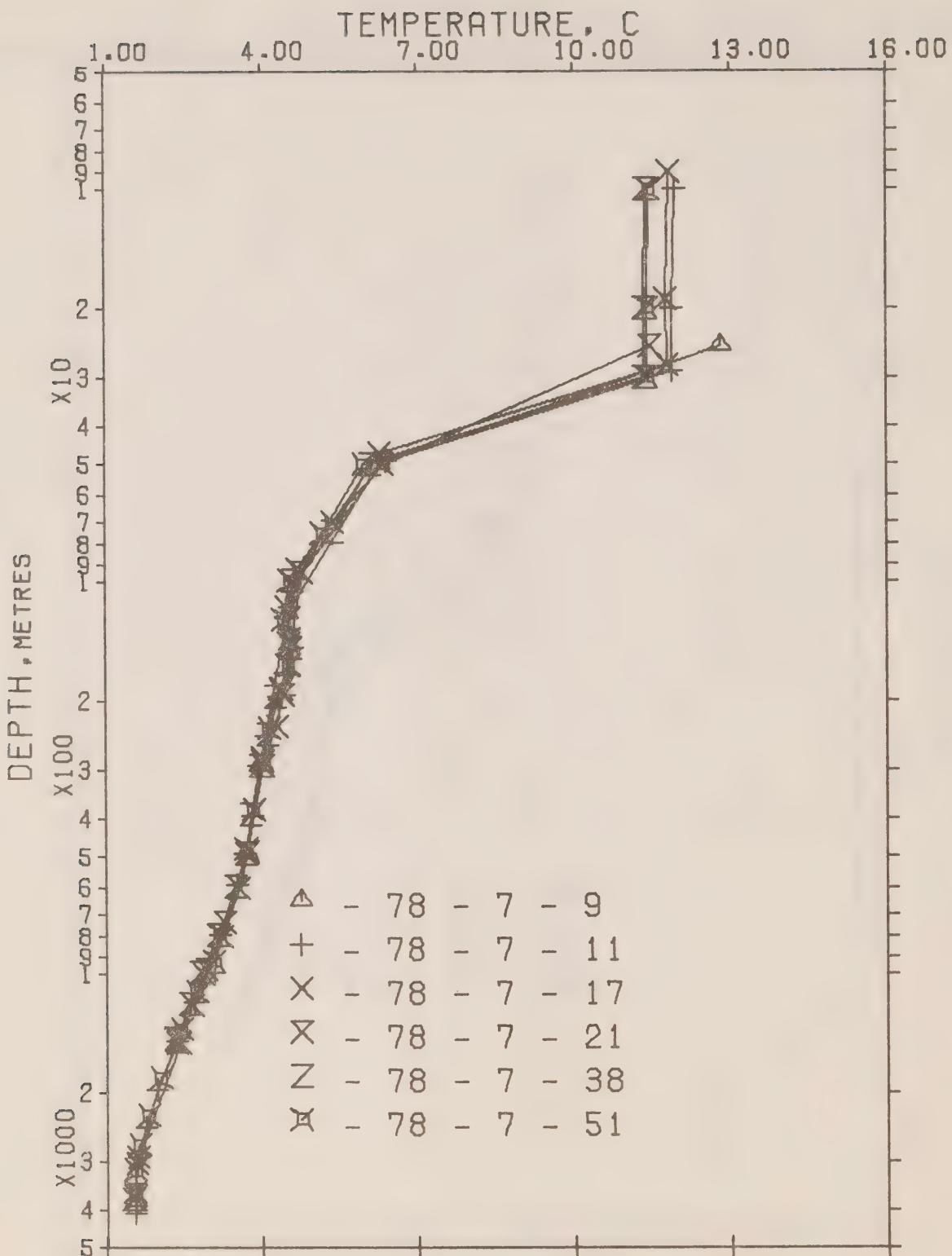


Figure 4(a). Composite plot of temperature vs  $\log_{10}$  depth for Station P.

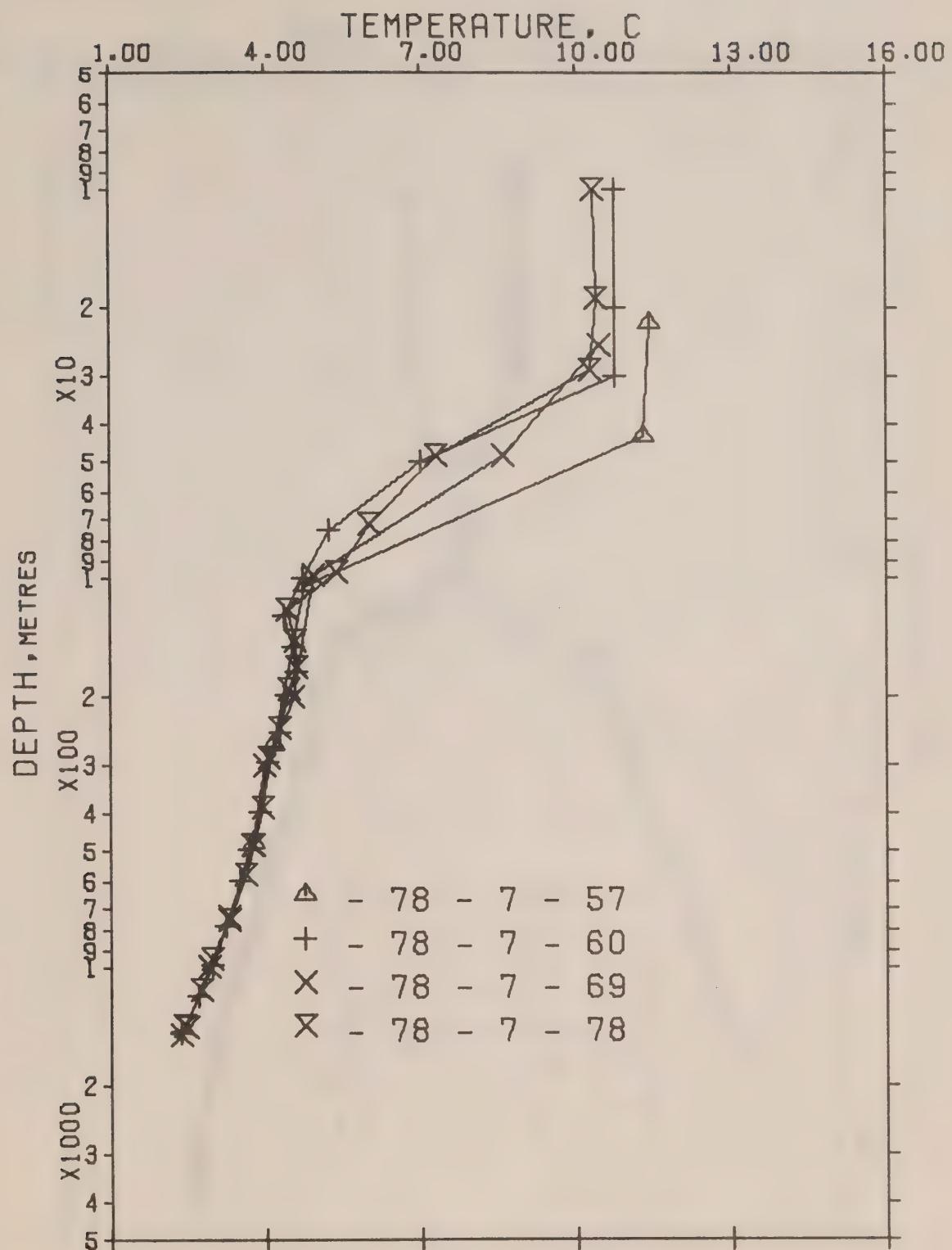


Figure 4(b). Composite plot of temperature vs  $\log_{10}$  depth for Station P.

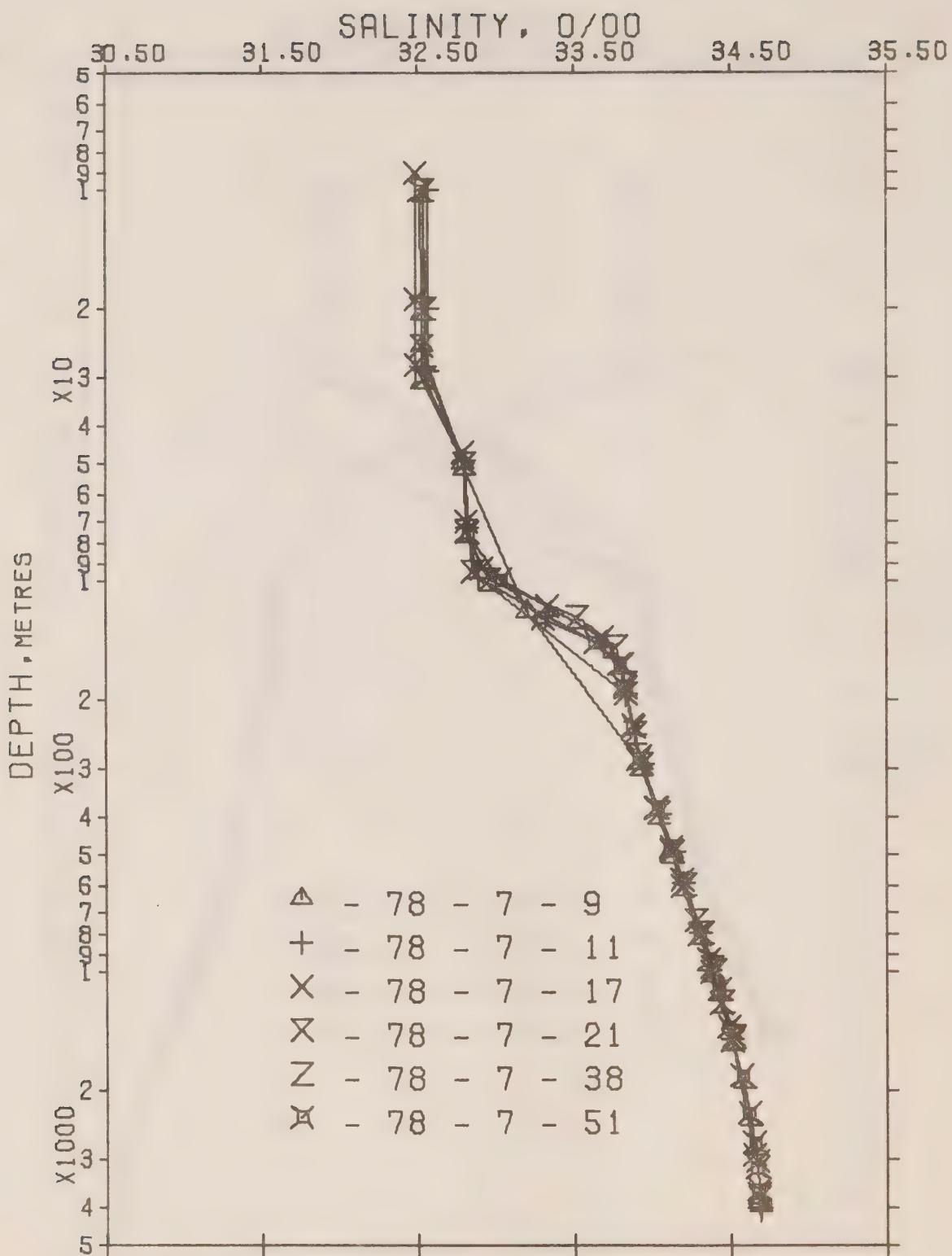


Figure 5(a). Composite plot of salinity vs  $\log_{10}$  depth for Station P.

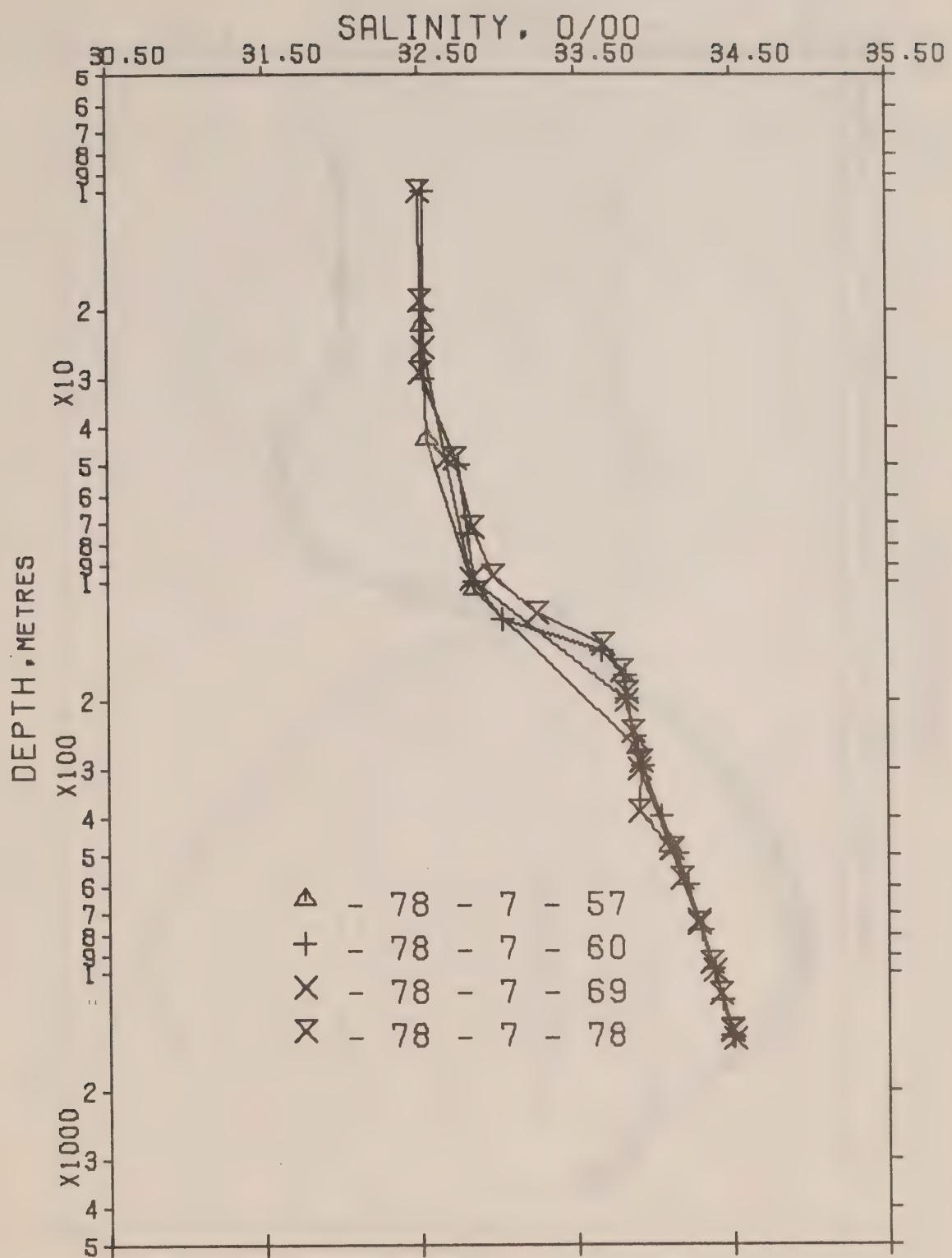


Figure 5(b). Composite plot of salinity vs  $\log_{10}$  depth for Station P.

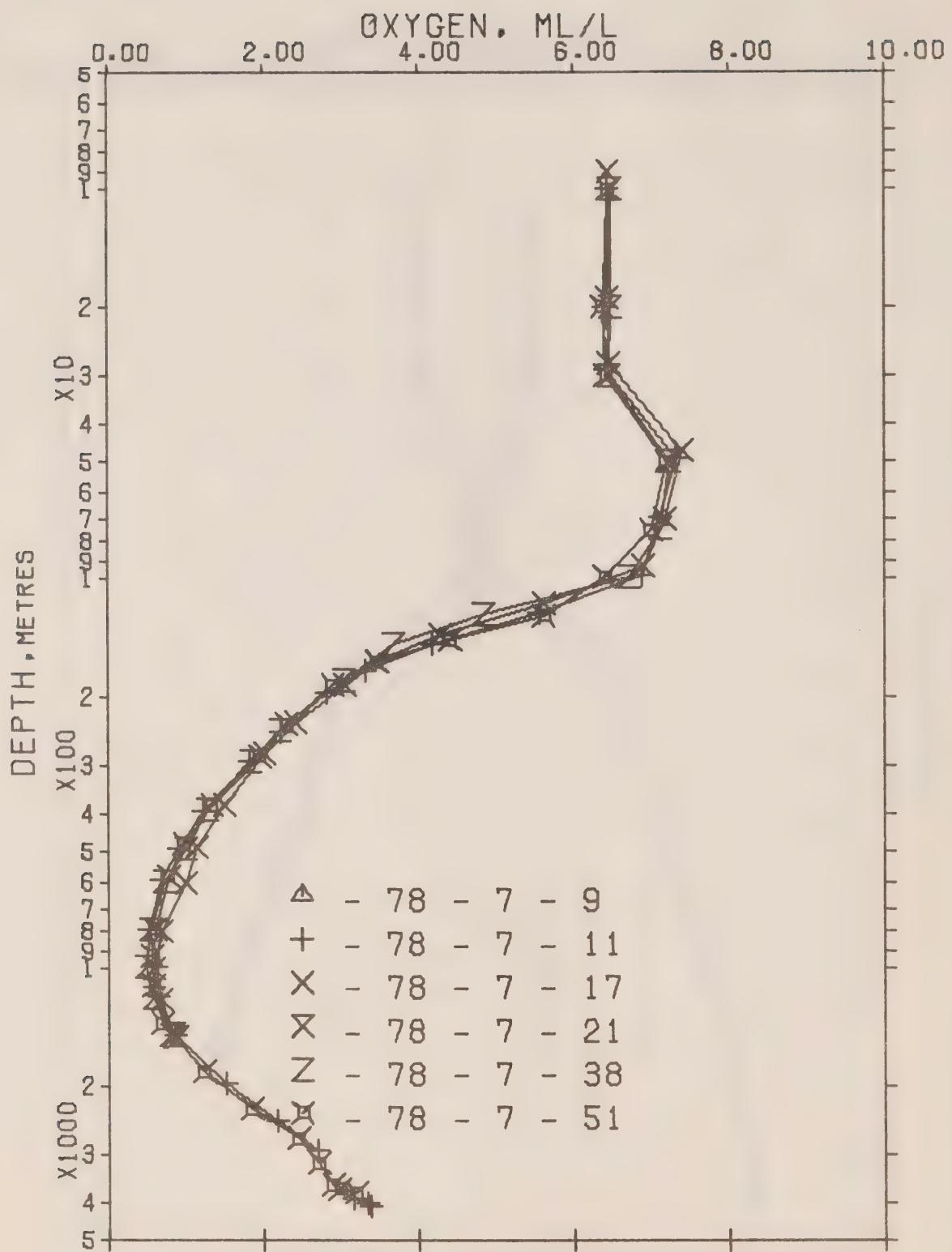


Figure 6(a). Composite plot of oxygen vs  $\log_{10}$  depth for Station P.

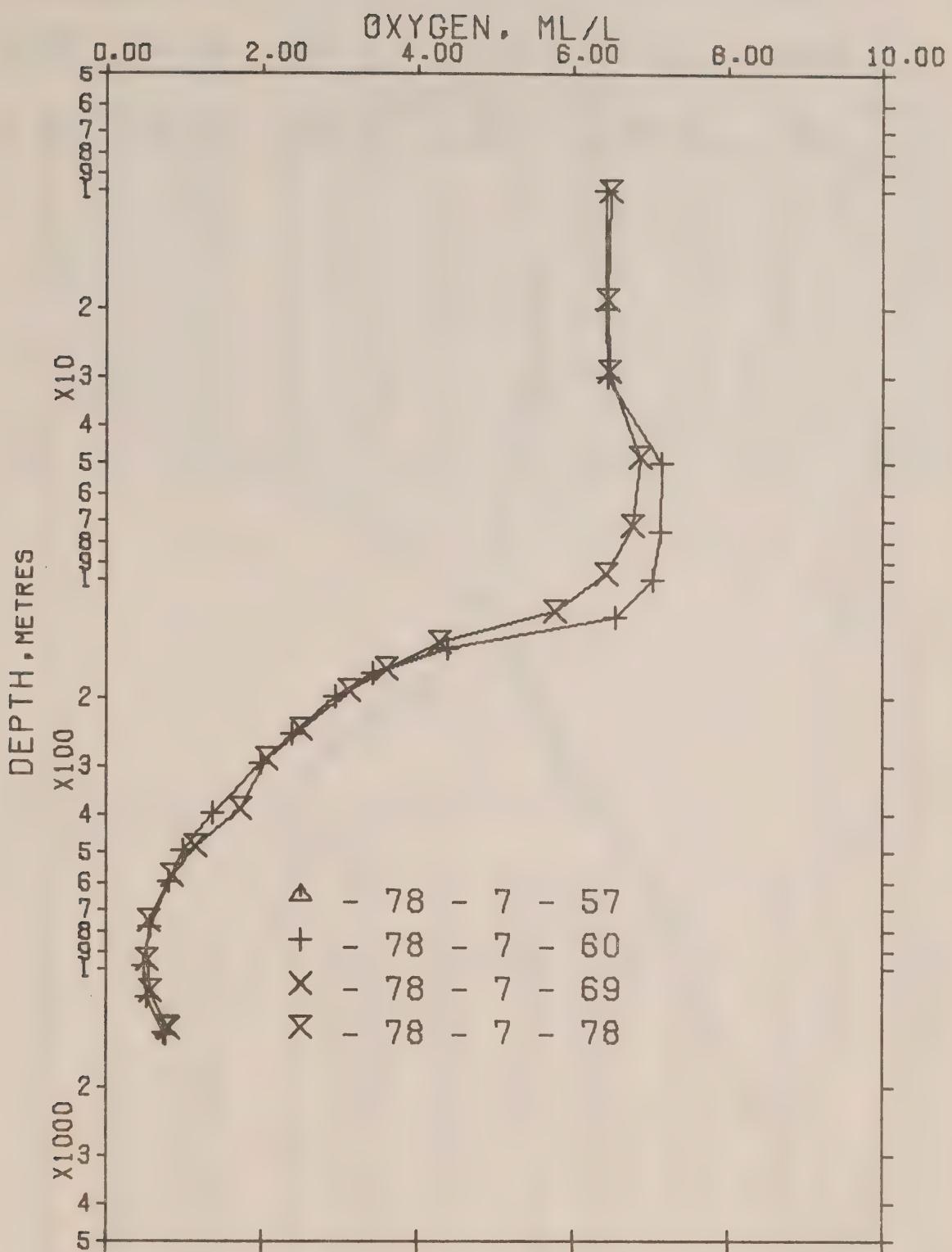
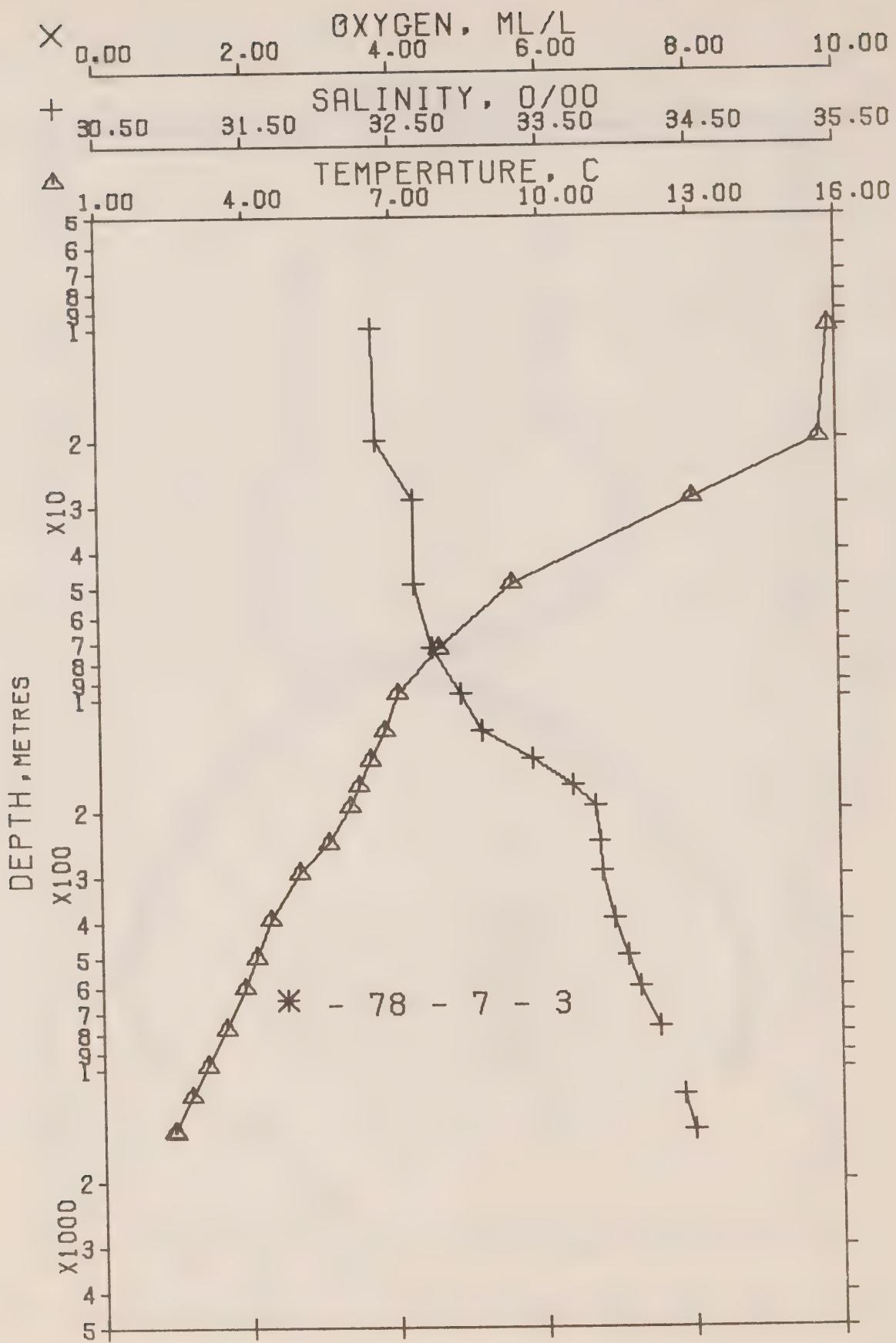


Figure 6(b). Composite plot of oxygen vs  $\log_{10}$  depth for Station P.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 3 DATE 9/ 9/78 GMT 19.1

POSITION 49-10.0 N, 132-40.0 W

STATION 7

## HYDROGRAPHIC CAST DATA

## OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SV A	THETA	SV A (THETA)	DELTA D	POT. EN	OXY	SOUND
0	15.85	32.366	0	23.781	412.8	15.85	412.8	.00	.00		1507.
10	15.84	32.367	10	23.784	412.8	15.84	412.5	.41	.02		1507.
20	15.63	32.394	20	23.851	406.7	15.63	406.0	.83	.09		1507.
30	13.05	32.636	29	24.576	337.7	13.05	336.9	1.17	.17		1499.
40	9.41	32.645	49	25.235	275.2	9.40	274.3	1.78	.41		1486.
70	7.90	32.756	73	25.551	245.3	7.89	244.1	2.41	.80		1481.
90	7.07	32.945	97	25.816	220.4	7.06	219.0	2.97	1.29		1478.
120	6.80	33.089	122	25.965	206.6	6.79	204.8	3.51	1.90		1478.
140	6.49	33.432	146	26.275	177.4	6.48	175.3	3.98	2.54		1477.
170	6.24	33.699	171	26.518	154.7	6.22	152.2	4.39	3.22		1477.
190	6.07	33.851	195	26.659	141.5	6.05	138.8	4.75	3.89		1477.
240	5.61	33.875	244	26.735	134.7	5.59	131.6	5.43	5.42		1476.
290	5.01	33.893	294	26.820	126.9	4.99	123.5	6.09	7.24		1474.
390	4.42	33.967	393	26.944	115.7	4.39	111.7	7.30	11.50		1474.
500	4.11	34.059	496	27.050	106.4	4.07	101.6	8.45	16.76		1474.
600	3.87	34.144	600	27.142	98.3	3.83	92.8	9.53	22.80		1475.
780	3.49	34.268	773	27.278	86.2	3.43	79.8	11.14	34.13		1476.
980	3.10	34.355	973	27.384	76.9	3.03	69.7	12.78	48.90		1478.
1180	2.76	34.425	1173	27.470	69.2	2.68	61.4	14.26	55.21		1480.
1479	2.41	34.502	1463	27.562	61.2	2.31	52.6	16.12	90.28		1484.
1489	2.45	34.504	1473	27.560	61.5	2.35	52.8	16.18	91.23		1484.

## OFFSHORE OCEANOGRAPHY GROUP

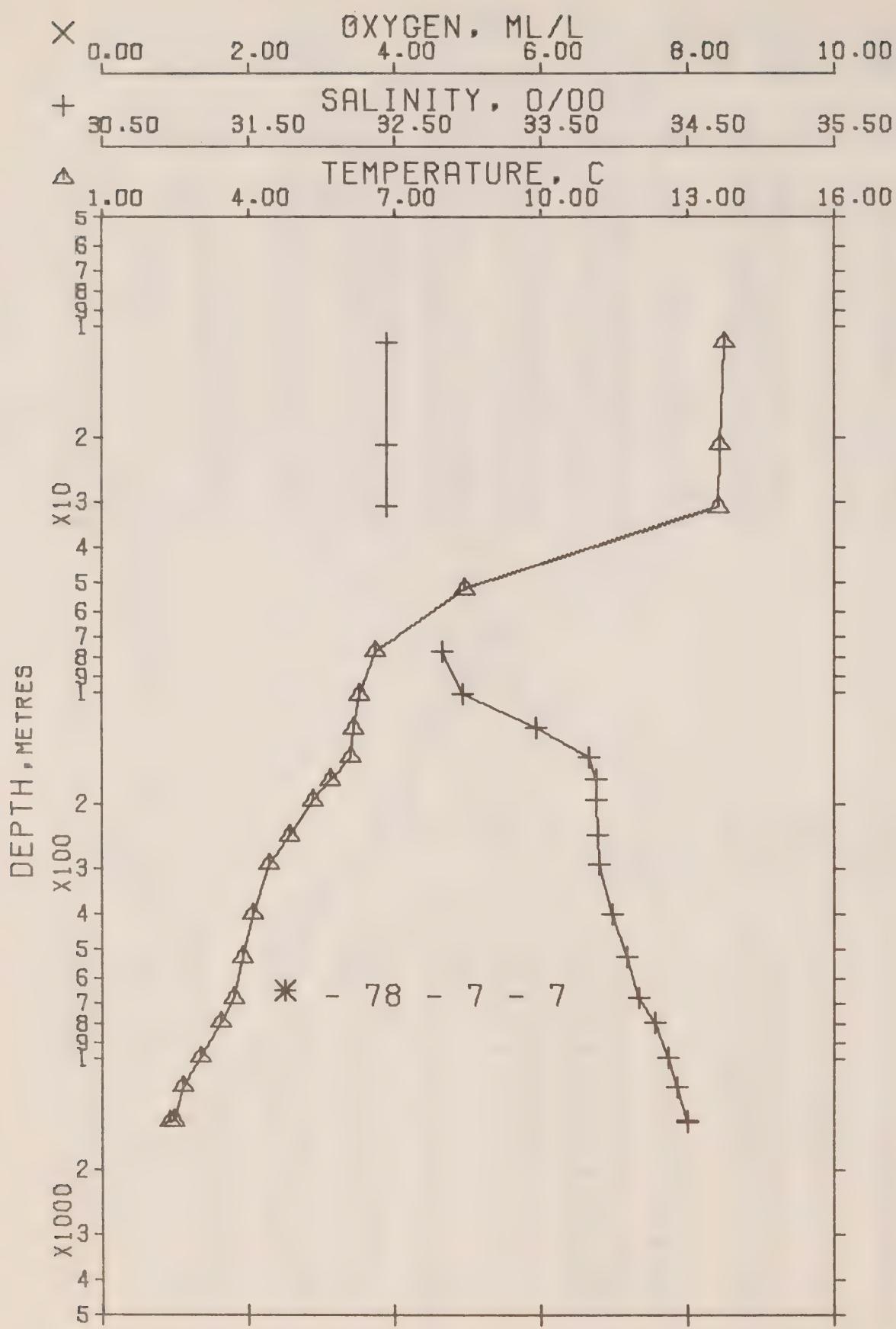
REFERENCE NO. 78- 7- 3 DATE 9/ 9/78 GMT 19.1

POSITION 49-10.0 N, 132-40.0 W

STATION 7

## INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SV A	THETA	SV A (THETA)	DELTA D	POT. EN	OXY	SOUND
0	15.85	32.366	0	23.781	412.8	15.85	412.8	.00	.00		1507.
10	15.84	32.367	10	23.784	412.8	15.84	412.5	.41	.02		1507.
20	15.63	32.394	20	23.851	406.7	15.63	406.0	.83	.09		1507.
30	12.85	32.637	30	24.617	333.9	12.84	333.1	1.20	.18		1498.
50	9.35	32.649	50	25.247	274.0	9.35	273.1	1.80	.42		1486.
75	7.84	32.770	75	25.572	243.4	7.83	242.2	2.45	.83		1481.
100	7.04	32.961	99	25.832	218.9	7.03	217.4	3.03	1.35		1478.
125	6.77	33.124	124	25.997	203.6	6.76	201.7	3.56	1.96		1478.
150	6.46	33.467	149	26.307	174.4	6.44	172.2	4.03	2.62		1477.
175	6.22	33.718	174	26.536	153.0	6.20	150.5	4.44	3.29		1477.
200	6.03	33.853	199	26.666	141.0	6.01	138.2	4.80	3.99		1477.
225	5.79	33.866	223	26.706	137.4	5.77	134.4	5.15	4.75		1476.
250	5.55	33.877	248	26.743	134.0	5.53	130.8	5.49	5.57		1476.
300	4.98	33.896	298	26.826	126.4	4.96	123.0	6.14	7.39		1474.
400	4.41	33.971	397	26.948	115.3	4.38	111.3	7.35	11.69		1474.
500	4.11	34.059	496	27.050	106.4	4.07	101.6	8.45	16.76		1474.
600	3.88	34.140	595	27.138	98.6	3.84	93.2	9.48	22.50		1475.
700	3.65	34.215	694	27.220	91.3	3.60	85.4	10.43	28.79		1476.
800	3.45	34.278	793	27.290	85.2	3.39	78.7	11.31	35.52		1477.
900	3.25	34.322	892	27.344	80.4	3.18	73.5	12.14	42.69		1477.
1000	3.07	34.361	991	27.392	76.2	3.00	68.9	12.92	50.27		1478.
1200	2.74	34.429	1188	27.476	68.7	2.66	60.9	14.37	66.48		1480.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 7 DATE 11/ 9/78 GMT 3.3

POSITION 49-41.0 N, 140-40.0 W

STATION 11

HYDROGRAPHIC CAST DATA

## OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT.	OXY	SOUND
0	13.75	32.450	0	24.293	364.0	13.75	364.0	.00	.00		1500.
11	13.74	32.454	11	24.298	363.8	13.74	363.5	.40	.02		1500.
21	13.67	32.455	21	24.313	362.6	13.67	362.0	.77	.08		1500.
31	13.64	32.455	31	24.319	362.3	13.64	361.4	1.13	.18		1500.
52	8.43	32.668	52	25.405	259.0	8.42	258.1	1.78	.45		1482.
77	6.60	32.831	77	25.789	222.6	6.59	221.6	2.38	.85		1476.
102	6.28	32.967	101	25.937	208.8	6.27	207.5	2.91	1.32		1475.
126	6.16	33.470	125	26.348	170.1	6.15	168.4	3.36	1.85		1476.
150	6.09	33.831	149	26.641	142.7	6.08	140.6	3.74	2.38		1476.
173	5.68	33.877	172	26.728	134.6	5.67	132.3	4.06	2.90		1475.
197	5.33	33.882	196	26.774	130.3	5.31	127.9	4.38	3.51		1474.
246	4.84	33.885	244	26.833	125.0	4.82	122.3	5.00	4.90		1473.
295	4.41	33.903	293	26.894	119.4	4.39	116.5	5.60	6.57		1472.
403	4.08	33.994	400	27.001	110.1	4.05	106.3	6.83	10.96		1472.
529	3.89	34.088	525	27.095	102.1	3.85	97.3	8.17	17.30		1474.
684	3.70	34.172	678	27.181	95.0	3.65	89.1	9.69	26.71		1476.
798	3.44	34.280	791	27.292	84.9	3.38	78.5	10.72	34.44		1477.
998	3.00	34.368	988	27.403	74.9	2.93	67.9	12.31	48.97		1478.
1198	2.66	34.435	1186	27.487	67.4	2.58	59.9	13.72	64.82		1480.
1489	2.46	34.500	1473	27.556	61.9	2.36	53.2	15.70	92.08		1484.
1498	2.39	34.504	1482	27.565	60.9	2.29	52.3	15.76	92.93		1484.

## OFFSHORE OCEANOGRAPHY GROUP

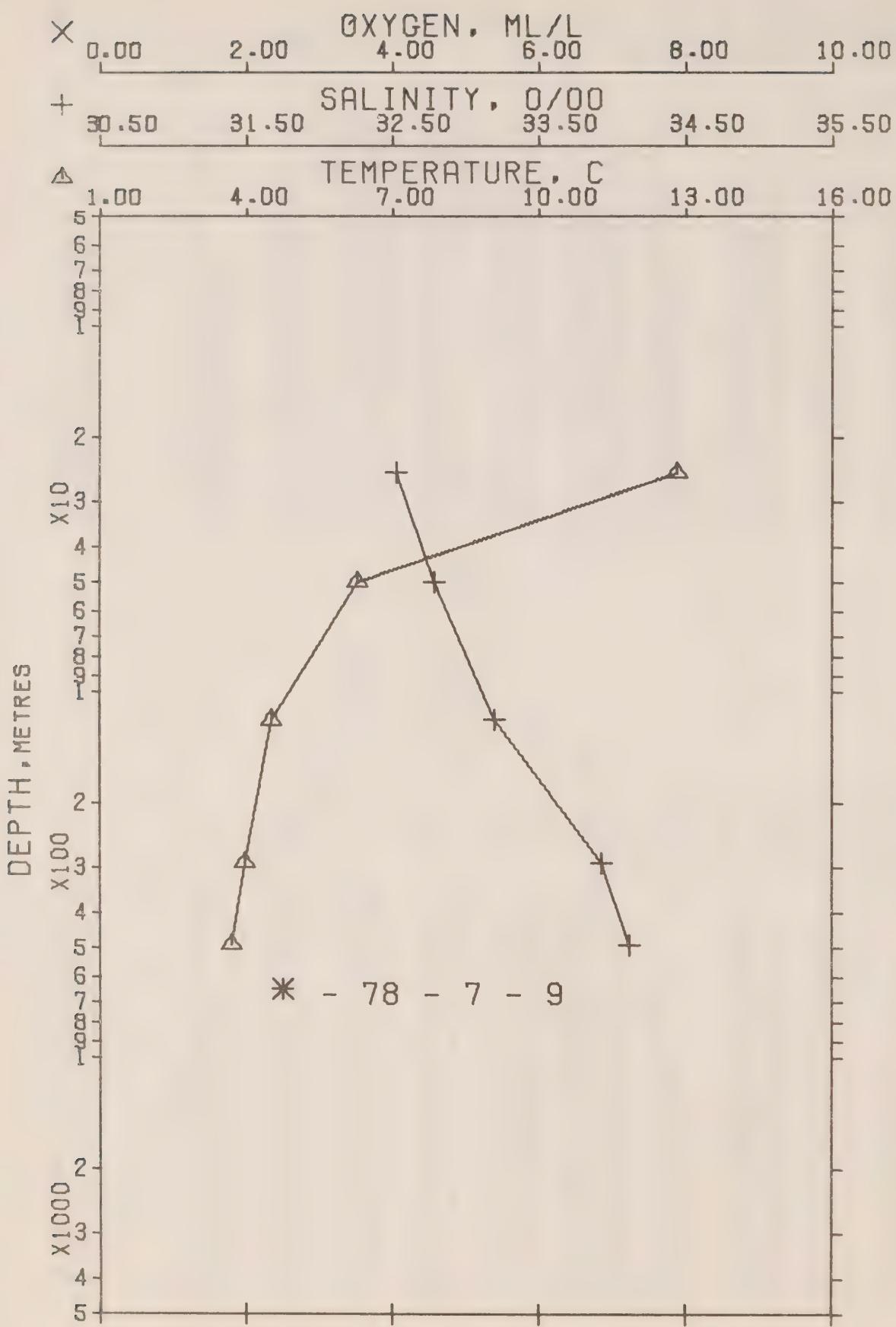
REFERENCE NO. 78- 7- 7 DATE 11/ 9/78 GMT 3.3

POSITION 49-41.0 N, 140-40.0 W

STATION 11

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT.	OXY	SOUND
0	13.75	32.450	0	24.293	364.0	13.75	364.0	.00	.00		1500.
10	13.74	32.454	10	24.298	363.8	13.74	363.5	.36	.02		1500.
20	13.68	32.455	20	24.312	362.7	13.67	362.1	.73	.07		1500.
30	13.64	32.455	30	24.319	362.3	13.64	361.5	1.09	.17		1500.
50	8.88	32.650	50	25.322	266.9	8.87	266.0	1.72	.42		1484.
75	6.75	32.818	75	25.759	225.5	6.74	224.4	2.33	.81		1476.
100	6.30	32.959	99	25.928	209.6	6.29	208.3	2.87	1.29		1475.
125	6.16	33.456	124	26.336	171.3	6.15	169.6	3.35	1.84		1476.
150	6.09	33.831	149	26.641	142.7	6.08	140.6	3.74	2.38		1476.
175	5.65	33.877	174	26.732	134.2	5.64	131.9	4.08	2.95		1475.
200	5.30	33.882	199	26.778	130.0	5.28	127.6	4.41	3.58		1474.
225	5.04	33.884	223	26.810	127.1	5.02	124.5	4.73	4.27		1473.
250	4.80	33.887	248	26.839	124.5	4.78	121.8	5.05	5.04		1473.
300	4.39	33.908	298	26.900	119.0	4.37	115.9	5.66	6.74		1472.
400	4.09	33.992	397	26.998	110.3	4.06	106.5	6.80	10.82		1472.
500	3.93	34.068	496	27.075	103.7	3.89	99.2	7.87	15.72		1473.
600	3.80	34.129	595	27.137	98.6	3.75	93.3	8.88	21.38		1475.
700	3.66	34.188	694	27.198	93.4	3.61	87.5	9.84	27.78		1476.
800	3.44	34.281	793	27.293	84.8	3.38	78.4	10.73	34.57		1477.
900	3.20	34.327	892	27.352	79.5	3.14	72.7	11.55	41.68		1477.
1000	3.00	34.369	990	27.404	74.8	2.93	67.7	12.32	49.15		1478.
1200	2.66	34.435	1188	27.487	67.4	2.58	59.8	13.74	64.98		1480.

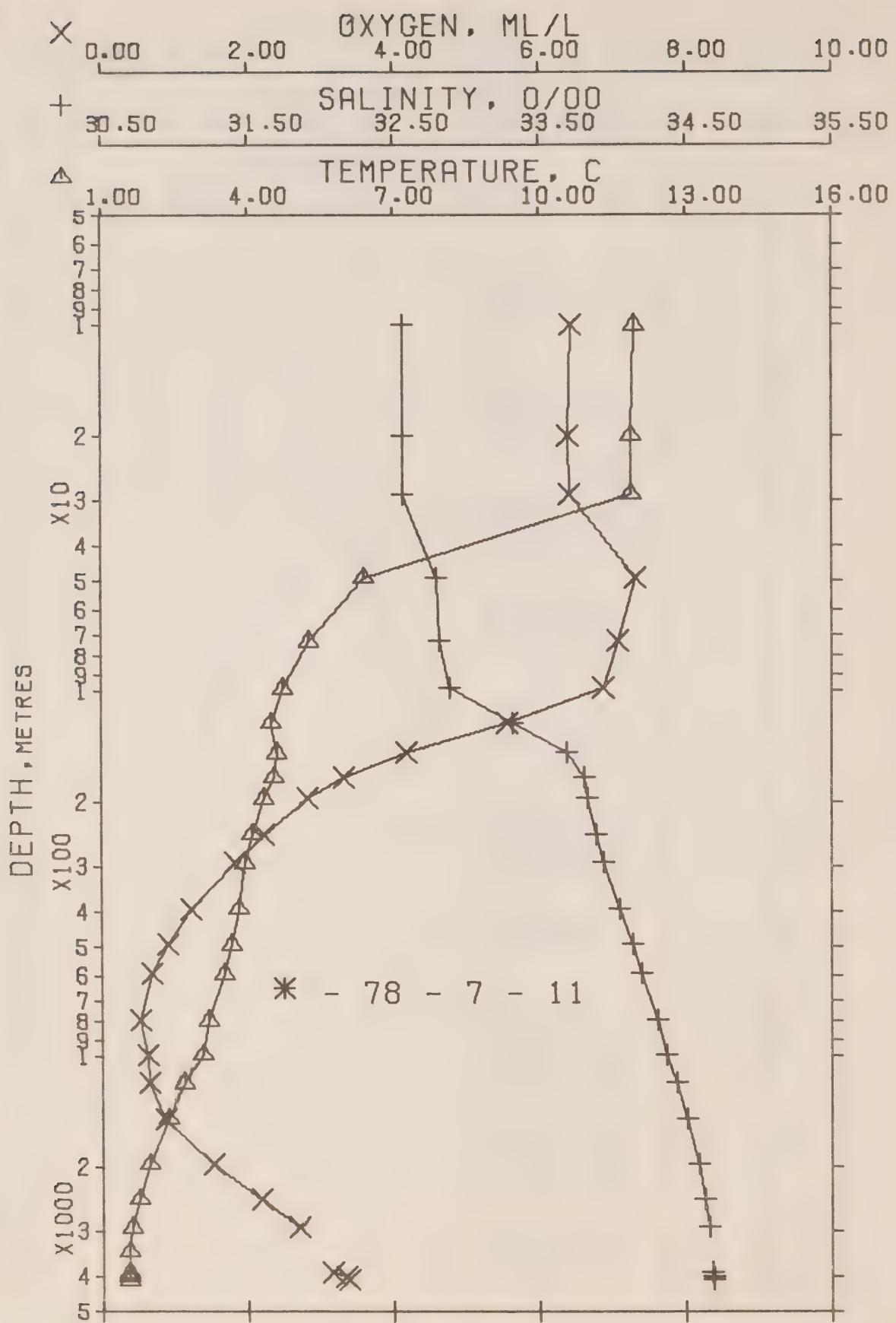


OFFSHORE OCEANOGRAPHY GROUP  
REFERENCE NO. 78- 7- 9  
POSITION 50° 0' N, 145° .0 W  
HYDROGRAPHIC CAST DATA

OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA <sub>T</sub>	SVA	THETA (THETA)	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	12.75	32.539	0	24.560	338.5	12.75	338.5	.00	.00	1497.	
25	12.82	32.534	25	24.543	340.8	12.82	340.1	.86	.11	1498.	
50	6.28	32.790	50	25.797	221.4	6.28	220.8	1.55	.37	1474.	
120	4.51	33.195	119	26.323	171.9	4.50	170.8	2.89	1.51	1469.	
295	3.96	33.930	293	26.963	112.7	3.94	110.0	5.30	6.47	1470.	
493	3.71	34.118	489	27.137	97.6	3.68	93.4	7.37	14.73	1472.	

STATION P



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 11

DATE 16/ 9/78

GMT 19.5

POSITION 50° .0 N, 145° .0 W

STATION P

HYDROGRAPHIC CAST DATA

## OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA	POT.	OXY	SOUND
							D	EN			
0	11.99	32.580	0	24.736	321.8	11.99	321.8	.00	.00	6.47	1494.
10	11.94	32.573	10	24.740	321.6	11.94	321.4	.32	.02	6.44	1494.
20	11.89	32.572	20	24.749	321.0	11.89	320.5	.65	.07	6.40	1494.
29	11.90	32.574	29	24.749	321.2	11.90	320.5	.94	.14	6.42	1495.
49	6.40	32.796	49	25.787	222.4	6.40	221.8	1.49	.36	7.32	1475.
73	5.25	32.816	73	25.942	207.8	5.24	207.1	2.01	.68	7.07	1470.
99	4.72	32.894	98	26.062	196.5	4.71	195.6	2.52	1.13	6.87	1469.
123	4.47	33.324	122	26.429	161.9	4.46	160.7	2.95	1.01	5.56	1469.
148	4.60	33.694	147	26.708	135.8	4.59	134.2	3.32	2.13	4.18	1470.
172	4.53	33.814	171	26.811	126.2	4.52	124.5	3.64	2.65	3.32	1470.
197	4.32	33.834	196	26.849	122.8	4.31	120.8	3.96	3.24	2.82	1470.
247	4.08	33.888	245	26.917	116.7	4.06	114.4	4.55	4.57	2.23	1470.
296	3.95	33.943	294	26.974	111.6	3.93	108.9	5.11	6.13	1.93	1470.
395	3.82	34.047	392	27.070	103.3	3.79	99.8	6.17	9.87	1.21	1471.
495	3.67	34.142	491	27.160	95.4	3.64	91.2	7.16	14.36	.90	1472.
596	3.51	34.202	591	27.223	90.0	3.47	85.1	8.10	19.57	.69	1473.
801	3.18	34.311	794	27.341	79.9	3.12	73.8	9.84	31.91	.51	1476.
996	3.06	34.374	986	27.403	75.1	2.99	67.9	11.34	45.66	.62	1478.
1194	2.68	34.440	1182	27.489	67.3	2.60	59.6	12.74	61.35	.65	1480.
1492	2.35	34.511	1476	27.574	59.9	2.25	51.5	14.63	87.16	.86	1484.
1989	1.95	34.587	1965	27.667	51.8	1.81	42.5	17.40	136.20	1.51	1490.
2486	1.74	34.634	2453	27.721	47.5	1.56	37.2	19.85	192.05	2.18	1498.
2983	1.60	34.656	2940	27.749	45.6	1.38	34.2	22.16	256.29	2.70	1506.
3480	1.53	34.671	3426	27.766	44.9	1.26	32.3	24.40	330.10	2.95	1514.
3977	1.53	34.684	3911	27.776	45.2	1.21	31.0	26.64	415.16	3.17	1522.
4076	1.54	34.688	4007	27.779	45.4	1.21	30.7	27.08	433.50	3.34	1524.
4166	1.53	34.694	4095	27.784	45.0	1.19	30.1	27.49	450.65	3.38	1526.

## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 11

DATE 16/ 9/78

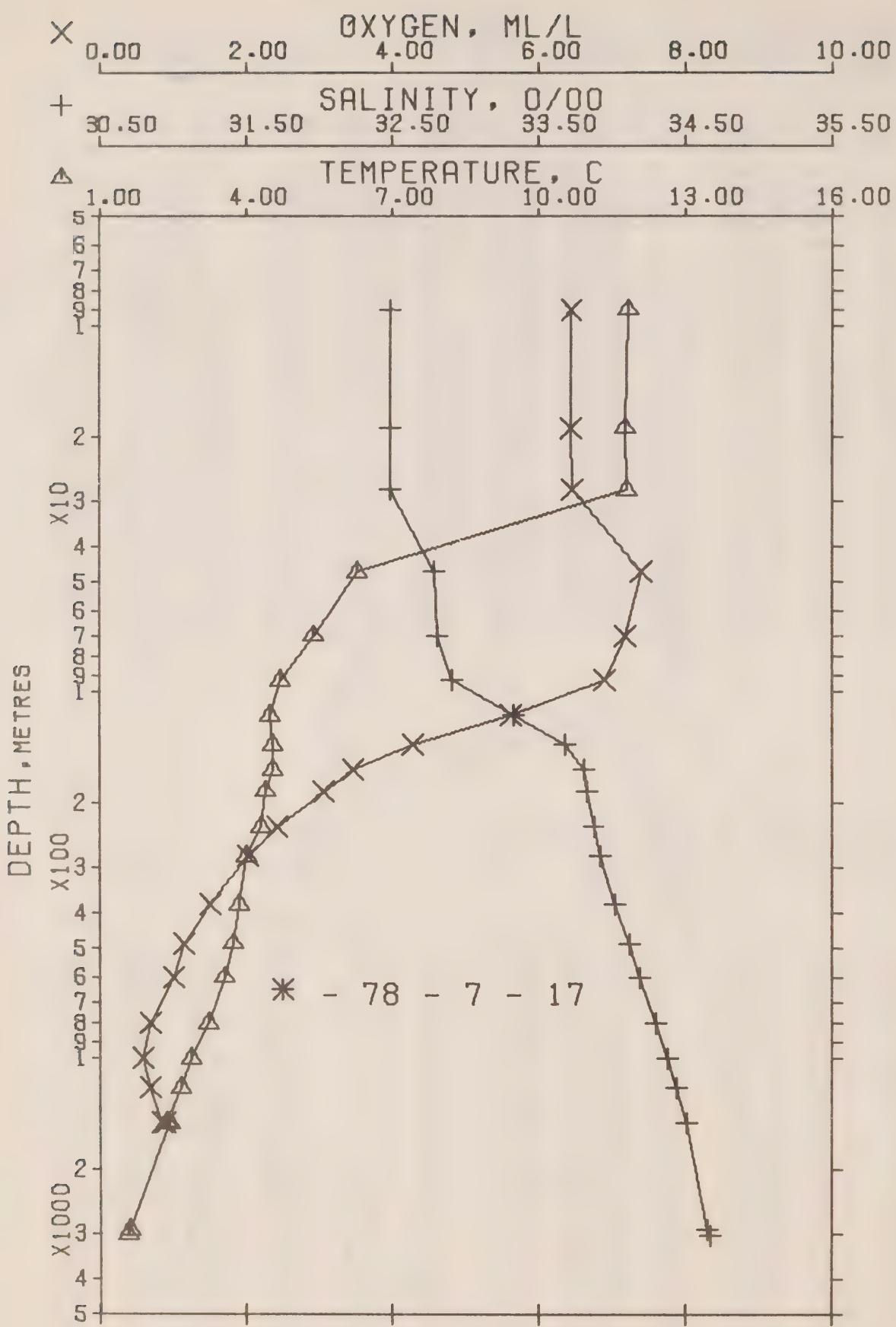
GMT 19.5

POSITION 50° .0 N, 145° .0 W

STATION P

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA	POT.	OXY	SOUND
							D	EN			
0	11.99	32.580	0	24.736	321.8	11.99	321.8	.00	.00	6.47	1494.
10	11.94	32.573	10	24.740	321.6	11.94	321.4	.32	.02	6.44	1494.
20	11.89	32.572	20	24.749	321.0	11.89	320.5	.65	.07	6.40	1494.
30	11.60	32.586	30	24.813	315.2	11.60	314.4	.97	.15	6.47	1494.
50	6.36	32.797	50	25.793	221.9	6.35	221.2	1.50	.36	7.31	1474.
75	5.21	32.822	75	25.950	207.0	5.21	206.2	2.04	.70	7.06	1470.
100	4.70	32.921	99	26.086	194.3	4.70	193.4	2.55	1.16	6.79	1469.
125	4.48	33.359	124	26.456	159.4	4.47	158.2	2.99	1.66	5.43	1469.
150	4.59	33.705	149	26.717	134.9	4.58	133.4	3.35	2.17	4.11	1470.
175	4.50	33.816	174	26.815	125.8	4.49	124.0	3.68	2.71	3.26	1470.
200	4.31	33.837	199	26.853	122.4	4.29	120.4	3.99	3.30	2.79	1470.
225	4.18	33.866	223	26.889	119.2	4.16	117.0	4.29	3.96	2.48	1470.
250	4.07	33.892	248	26.921	116.3	4.05	114.0	4.58	4.67	2.20	1470.
300	3.94	33.948	298	26.978	111.2	3.92	108.5	5.15	6.26	1.80	1470.
400	3.81	34.052	397	27.075	102.9	3.78	99.3	6.22	10.08	1.20	1471.
500	3.66	34.145	496	27.163	95.1	3.63	90.9	7.21	14.60	.88	1472.
600	3.50	34.204	595	27.226	89.8	3.46	84.9	8.13	19.78	.69	1473.
700	3.33	34.261	694	27.288	84.5	3.28	79.0	9.00	25.55	.59	1474.
800	3.18	34.310	793	27.341	79.9	3.13	73.9	9.82	31.82	.51	1476.
900	3.12	34.345	892	27.374	77.3	3.05	70.7	10.61	38.61	.57	1477.
1000	3.05	34.376	990	27.405	75.0	2.98	67.7	11.37	45.99	.62	1478.
1200	2.67	34.442	1188	27.491	67.1	2.59	59.5	12.78	61.82	.65	1480.
1500	2.34	34.512	1484	27.576	59.7	2.24	51.3	14.68	87.85	.87	1484.
2000	1.94	34.588	1976	27.668	51.7	1.81	42.4	17.46	137.33	1.53	1491.
2500	1.74	34.635	2467	27.721	47.4	1.56	37.1	19.92	193.72	2.19	1498.
3000	1.60	34.657	2956	27.749	45.5	1.38	34.2	22.23	258.63	2.71	1506.
3500	1.53	34.672	3445	27.766	44.9	1.26	32.3	24.49	333.25	2.96	1514.
4000	1.53	34.685	3933	27.777	45.3	1.21	30.9	26.74	419.34	3.21	1523.
4100	1.54	34.690	4031	27.780	45.3	1.20	30.5	27.19	438.06	3.35	1525.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 17

DATE 19/ 9/78

GMT 19.3

POSITION 50- .0 N, 145-

.0 W

STATION P

HYDROGRAPHIC CAST DATA

## OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT.	OXY	SOUND
0	11.84	32.496	0	24.699	325.3	11.84	325.3	.00	.00	6.48	1494.
9	11.82	32.492	9	24.700	325.4	11.82	325.2	.29	.01	6.45	1494.
19	11.78	32.492	19	24.707	324.9	11.78	324.5	.62	.06	6.44	1494.
28	11.79	32.495	28	24.708	325.1	11.79	324.4	.92	.13	6.46	1494.
47	6.29	32.794	47	25.799	221.2	6.29	220.6	1.44	.33	7.40	1474.
70	5.38	32.807	70	25.920	209.9	5.37	209.1	1.94	.63	7.17	1471.
94	4.70	32.911	93	26.078	195.0	4.69	194.1	2.41	1.02	6.91	1469.
117	4.47	33.334	116	26.437	161.1	4.46	160.0	2.82	1.46	5.61	1468.
140	4.54	33.675	139	26.700	136.5	4.53	135.0	3.16	1.91	4.28	1470.
164	4.55	33.808	163	26.804	126.8	4.54	125.1	3.48	2.40	3.46	1470.
187	4.38	33.851	186	26.840	123.5	4.37	121.7	3.77	2.92	3.05	1470.
235	4.31	33.875	233	26.883	119.9	4.29	117.6	4.35	4.16	2.43	1470.
283	4.00	33.916	281	26.947	114.0	3.98	111.5	4.91	5.05	2.02	1470.
384	3.84	34.021	381	27.047	105.3	3.81	102.0	6.02	9.40	1.51	1471.
490	3.72	34.116	486	27.134	97.8	3.69	93.6	7.09	14.19	1.14	1472.
604	3.56	34.191	599	27.210	91.4	3.52	86.4	8.17	20.20	1.00	1474.
807	3.22	34.300	800	27.329	81.1	3.16	75.0	9.92	32.75	.68	1476.
1010	2.87	34.381	1000	27.425	72.6	2.80	65.8	11.47	47.11	.58	1476.
1212	2.66	34.437	1200	27.489	67.4	2.58	59.7	12.89	63.11	.67	1480.
1507	2.36	34.505	1490	27.568	60.5	2.26	52.0	14.76	89.12	.84	1484.
1517	2.42	34.513	1500	27.570	60.6	2.32	51.9	14.82	90.07	.88	1484.

OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 17

DATE 19/ 9/78

GMT 19.3

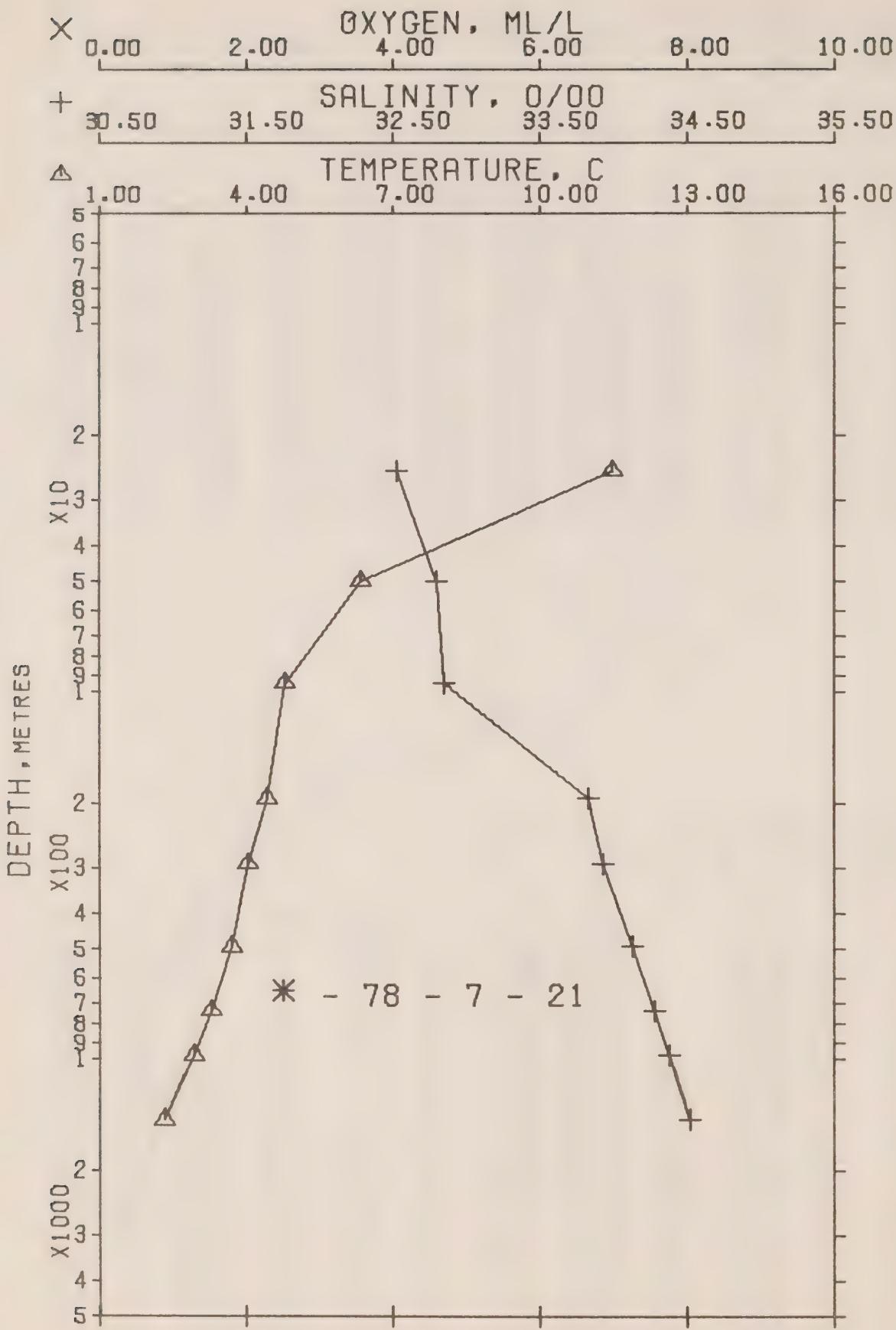
POSITION 50- .0 N, 145-

.0 W

STATION P

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT.	OXY	SOUND
0	11.84	32.496	0	24.699	325.3	11.84	325.3	.00	.00	6.48	1494.
10	11.81	32.492	10	24.701	325.4	11.81	325.1	.33	.02	6.45	1494.
20	11.78	32.492	20	24.707	325.0	11.78	324.5	.65	.07	6.44	1494.
30	11.12	32.531	30	24.858	310.8	11.11	310.2	.98	.15	6.57	1492.
50	6.16	32.796	50	25.817	219.6	6.16	218.9	1.50	.36	7.37	1474.
75	5.23	32.830	75	25.955	206.6	5.22	205.8	2.03	.70	7.11	1470.
100	4.63	33.038	99	26.186	184.8	4.62	183.9	2.53	1.14	6.52	1468.
125	4.50	33.463	124	26.536	151.8	4.49	150.6	2.95	1.62	5.11	1469.
150	4.54	33.733	149	26.745	132.3	4.53	130.7	3.30	2.11	3.92	1470.
175	4.47	33.819	174	26.822	125.2	4.45	123.4	3.62	2.64	3.26	1470.
200	4.36	33.844	199	26.853	122.5	4.35	120.5	3.93	3.23	2.87	1470.
225	4.32	33.867	223	26.875	120.6	4.31	118.4	4.23	3.89	2.55	1470.
250	4.21	33.889	248	26.905	117.9	4.19	115.5	4.53	4.01	2.29	1470.
300	3.97	33.936	298	26.966	112.4	3.95	109.7	5.10	6.22	1.92	1470.
400	3.82	34.037	397	27.062	104.1	3.79	100.6	6.19	10.07	1.45	1471.
500	3.70	34.123	496	27.142	97.2	3.67	92.9	7.19	14.68	1.13	1473.
600	3.57	34.189	595	27.207	91.6	3.52	86.6	8.13	19.97	1.01	1474.
700	3.39	34.246	694	27.270	86.2	3.34	80.6	9.02	25.86	.84	1475.
800	3.23	34.297	793	27.325	81.5	3.18	75.4	9.86	32.26	.69	1476.
900	3.05	34.339	892	27.376	77.0	2.99	70.5	10.65	39.12	.63	1477.
1000	2.89	34.377	990	27.421	73.0	2.82	66.2	11.40	46.38	.58	1478.
1200	2.67	34.434	1188	27.485	67.7	2.59	60.0	12.80	62.08	.67	1480.
1500	2.37	34.504	1484	27.567	60.6	2.26	52.2	14.72	88.51	.84	1484.

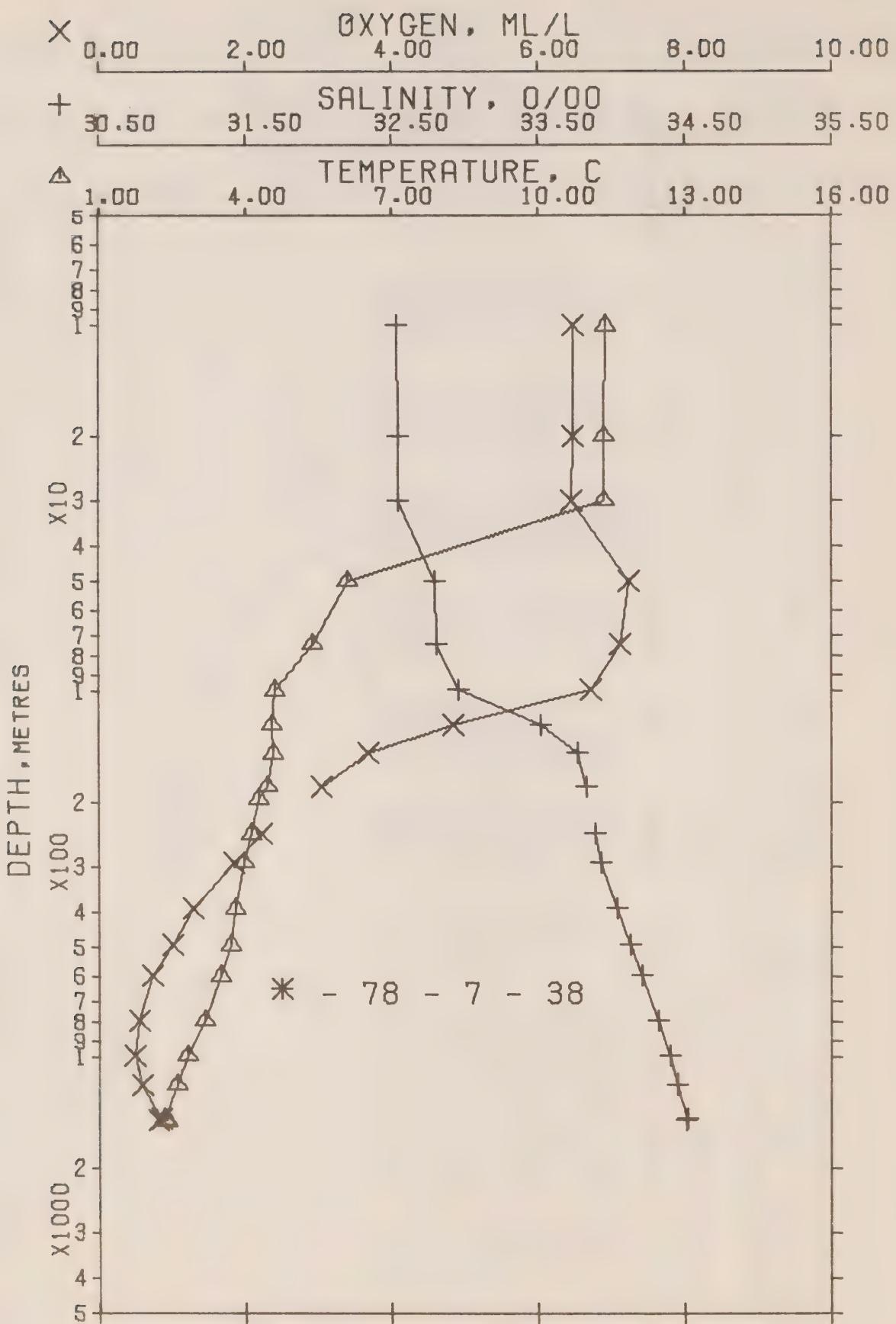


OFFSHORE OCEANOGRAPHY GROUP  
 REFERENCE NO. 78-7-21  
 POSITION 50° 0' N, 145° .0 W  
 HYDROGRAPHIC CAST DATA

DATE 21 / 9/78      GMT 17.8  
 STATION P

OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA <sub>T</sub>	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	11.49	32.541	0	24.798	315.9	11.49	315.9	.00	.00	1493.	
25	11.48	32.535	25	24.795	316.7	11.48	316.1	.80	.10	1493.	
50	6.33	32.804	50	25.802	221.0	6.33	220.3	1.46	.35	1474.	
95	4.77	32.847	94	26.020	200.5	4.76	199.6	2.37	1.03	1469.	
195	4.41	33.826	194	26.833	124.3	4.40	122.3	3.96	3.31	1470.	
295	4.04	33.930	293	26.954	113.5	4.02	110.8	5.14	6.26	1470.	
497	3.69	34.131	493	27.149	96.5	3.65	92.2	7.25	14.71	1472.	
740	3.27	34.277	733	27.306	82.9	3.22	77.2	9.41	28.29	1475.	
983	2.91	34.383	974	27.423	72.8	2.84	66.0	11.30	44.85	1478.	
1472	2.33	34.517	1456	27.580	59.1	2.23	50.9	14.50	84.61	1483.	



OFFSHORE OCEANOGRAPHY GROUP  
 REFERENCE NO. 78- 7- 38  
 POSITION 50° .0 N, 145° .0 W  
 HYDROGRAPHIC CAST DATA

DATE 25/ 9/78 GMT 19.6

STATION P

## OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	THETA	SVA (THETA)	DELTA	POT.	OXY	SOUND
				T			D	EN			
0	11.42	32.551	0	24.819	313.9	11.42	313.9	.00	.00	.45	1492.
10	11.39	32.541	10	24.816	314.4	11.39	314.1	.32	.02	6.48	1492.
20	11.35	32.550	20	24.831	313.2	11.35	312.8	.63	.06	6.47	1492.
30	11.36	32.545	30	24.825	314.0	11.36	313.3	.95	.15	6.46	1493.
50	6.09	32.803	50	25.831	218.2	6.09	217.6	1.49	.36	7.23	1473.
74	5.37	32.809	74	25.922	209.7	5.36	208.9	1.98	.68	7.12	1471.
100	4.61	32.956	99	26.123	190.7	4.60	189.8	2.48	1.13	6.71	1468.
124	4.54	33.517	123	26.575	148.2	4.53	146.9	2.89	1.59	4.83	1469.
148	4.56	33.771	147	26.774	129.6	4.55	128.0	3.22	2.05	3.68	1470.
182	4.44	33.831	181	26.834	124.1	4.43	122.3	3.66	2.78	3.05	1470.
197	4.28	33.848	196	26.865	121.3	4.27	119.4	3.84	3.14	2.82	1470.
246	4.12	33.895	244	26.918	116.5	4.10	114.2	4.42	4.44	2.21	1470.
295	3.98	33.935	293	26.965	112.5	3.96	109.8	4.99	6.00	1.83	1470.
394	3.79	34.038	391	27.066	103.6	3.76	100.2	6.05	9.75	1.27	1471.
496	3.70	34.130	492	27.148	96.6	3.67	92.4	7.07	14.38	.99	1473.
602	3.49	34.209	597	27.231	89.3	3.45	84.4	8.06	19.89	.72	1473.
798	3.17	34.318	791	27.348	79.2	3.12	73.2	9.71	31.62	.53	1475.
998	2.81	34.398	988	27.444	70.7	2.74	64.0	11.20	45.23	.49	1477.
1198	2.58	34.450	1186	27.506	65.4	2.50	58.1	12.56	60.49	.58	1480.
1489	2.33	34.520	1473	27.583	59.0	2.23	50.7	14.26	83.60	.83	1484.
1499	2.37	34.515	1483	27.575	59.8	2.27	51.3	14.32	84.52	.80	1484.

OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 38

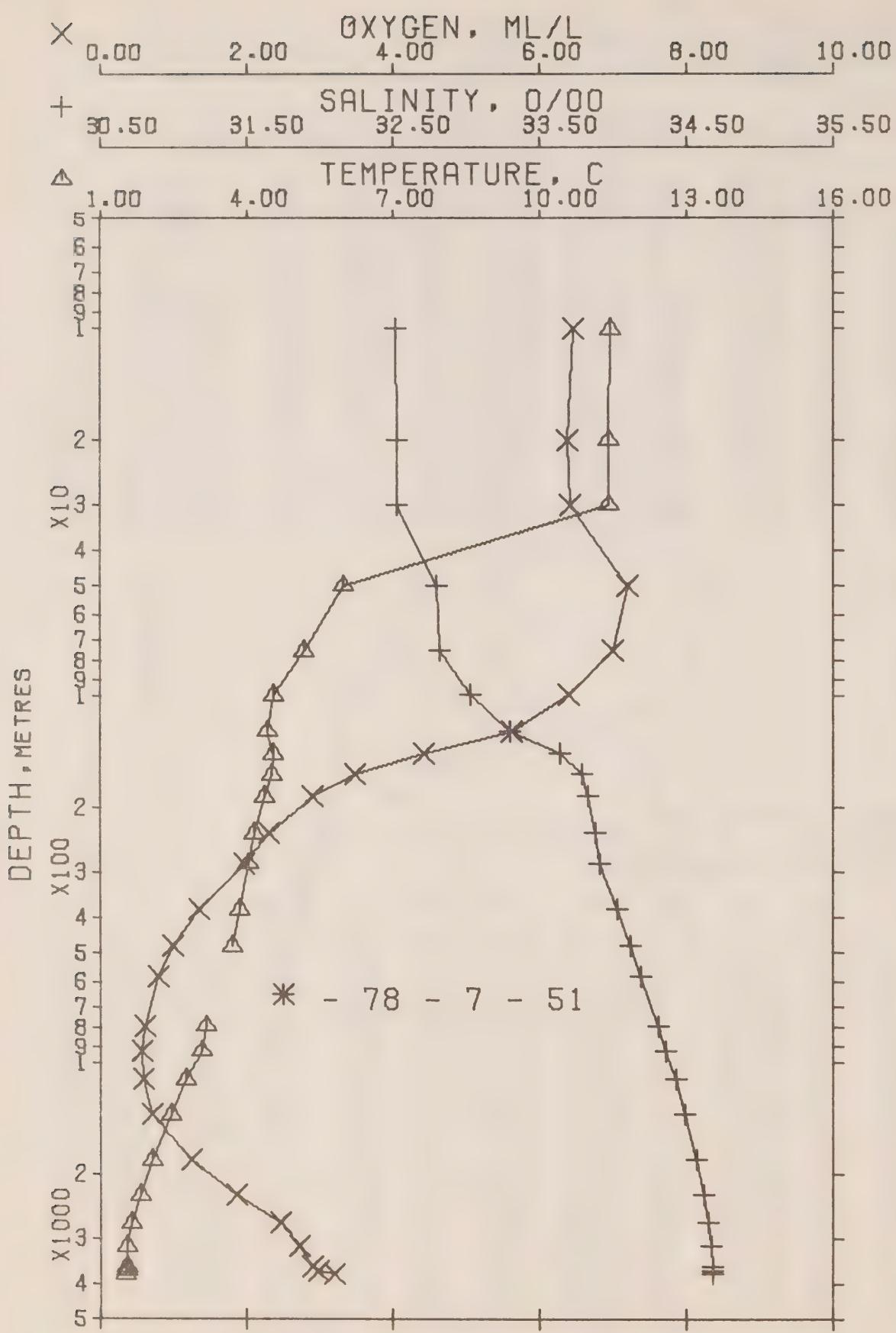
DATE 25/ 9/78 GMT 19.6

STATION P

POSITION 50° .0 N, 145° .0 W

INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	THETA	SVA (THETA)	DELTA	POT.	OXY	SOUND
				T			D	EN			
0	11.42	32.551	0	24.819	313.9	11.42	313.9	.00	.00	6.45	1492.
10	11.39	32.541	10	24.816	314.4	11.39	314.1	.32	.02	6.48	1492.
20	11.35	32.550	20	24.831	313.2	11.35	312.8	.63	.06	6.47	1492.
30	11.36	32.545	30	24.825	314.0	11.36	313.3	.95	.15	6.46	1493.
50	6.09	32.803	50	25.831	218.2	6.09	217.6	1.49	.36	7.23	1473.
75	5.35	32.813	75	25.928	209.2	5.34	208.4	1.99	.69	7.11	1471.
100	4.61	32.956	99	26.123	190.7	4.60	189.8	2.48	1.13	6.71	1468.
125	4.54	33.531	124	26.585	147.1	4.53	145.9	2.91	1.61	4.77	1469.
150	4.55	33.775	149	26.777	129.2	4.54	127.7	3.25	2.09	3.64	1470.
175	4.46	33.819	174	26.822	125.2	4.45	123.4	3.57	2.62	3.17	1470.
200	4.27	33.851	199	26.868	121.0	4.26	119.1	3.88	3.21	2.79	1470.
225	4.18	33.876	223	26.897	118.4	4.17	116.3	4.17	3.85	2.46	1470.
250	4.11	33.899	248	26.923	116.2	4.09	113.8	4.47	4.56	2.18	1470.
300	3.97	33.941	298	26.970	112.0	3.95	109.3	5.04	6.16	1.80	1470.
400	3.78	34.044	397	27.071	103.2	3.76	99.7	6.11	9.99	1.25	1471.
500	3.69	34.133	496	27.151	96.3	3.66	92.0	7.11	14.57	.98	1473.
600	3.49	34.208	595	27.229	89.5	3.45	84.6	8.04	19.77	.72	1473.
700	3.32	34.267	694	27.293	83.9	3.27	78.4	8.91	25.51	.62	1474.
800	3.17	34.319	793	27.349	79.1	3.11	73.1	9.72	31.73	.53	1475.
900	2.98	34.361	892	27.400	74.6	2.92	68.2	10.49	38.38	.51	1476.
1000	2.81	34.399	990	27.445	70.6	2.74	63.9	11.21	45.40	.49	1477.
1200	2.58	34.450	1188	27.506	65.4	2.50	58.0	12.57	60.63	.58	1480.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 51

DATE 3/10/78 GMT 18.5

POSITION 50- .0 N, 145- .0 W

STATION P

## HYDROGRAPHIC CAST DATA

## OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	11.51	32.526	0	24.783	317.3	11.51	317.3	.00	.00	6.39	1493.
10	11.45	32.523	10	24.792	316.7	11.45	316.5	.32	.02	6.45	1493.
20	11.42	32.526	20	24.799	316.2	11.42	315.7	.64	.07	6.37	1493.
30	11.42	32.528	30	24.801	316.3	11.42	315.6	.96	.15	6.43	1493.
50	5.97	32.797	50	25.841	217.2	5.97	216.6	1.49	.36	7.20	1473.
75	5.18	32.821	75	25.954	206.7	5.17	205.9	2.00	.69	6.99	1470.
100	4.54	33.031	99	26.190	184.4	4.53	183.5	2.47	1.11	6.40	1468.
125	4.42	33.297	124	26.413	163.4	4.41	162.2	2.91	1.61	5.63	1468.
144	4.54	33.637	143	26.670	139.3	4.53	137.9	3.20	2.01	4.42	1470.
164	4.52	33.792	163	26.795	127.7	4.51	126.0	3.46	2.43	3.48	1470.
188	4.35	33.833	187	26.845	123.1	4.34	121.2	3.77	2.97	2.89	1470.
238	4.15	33.876	236	26.900	118.2	4.13	116.0	4.36	4.27	2.30	1470.
286	4.03	33.915	284	26.944	114.4	4.01	111.8	4.93	5.77	1.96	1470.
384	3.84	34.034	381	27.057	104.4	3.81	101.0	6.00	9.42	1.33	1471.
483	3.71	34.118	479	27.137	97.5	3.68	93.4	6.99	13.82	.98	1472.
584	3.50	34.189	579	27.214	90.8	3.46	86.1	7.94	18.99	.78	1473.
796	3.17	34.307	789	27.339	80.0	3.12	74.1	9.75	31.66	.59	1475.
932	3.07	34.362	923	27.392	75.7	3.01	68.9	10.80	40.94	.57	1477.
1118	2.73	34.428	1107	27.475	68.3	2.65	61.0	12.14	54.91	.58	1479.
1396	2.43	34.488	1381	27.549	62.0	2.34	53.9	13.95	78.01	.70	1482.
1858	2.04	34.571	1836	27.647	53.5	1.91	44.4	16.61	122.05	1.23	1489.
2316	1.81	34.620	2286	27.704	48.8	1.65	38.8	18.95	171.69	1.85	1495.
2769	1.63	34.650	2730	27.742	45.8	1.43	35.0	21.08	227.04	2.45	1502.
3216	1.54	34.667	3168	27.762	44.6	1.30	32.9	23.10	288.62	2.71	1509.
3656	1.53	34.677	3598	27.771	44.9	1.24	31.7	25.07	357.51	2.89	1517.
3744	1.55	34.677	3683	27.769	45.4	1.25	31.8	25.46	372.37	2.99	1518.
3822	1.51	34.678	3760	27.773	45.0	1.21	31.4	25.82	386.15	3.20	1520.

## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 51

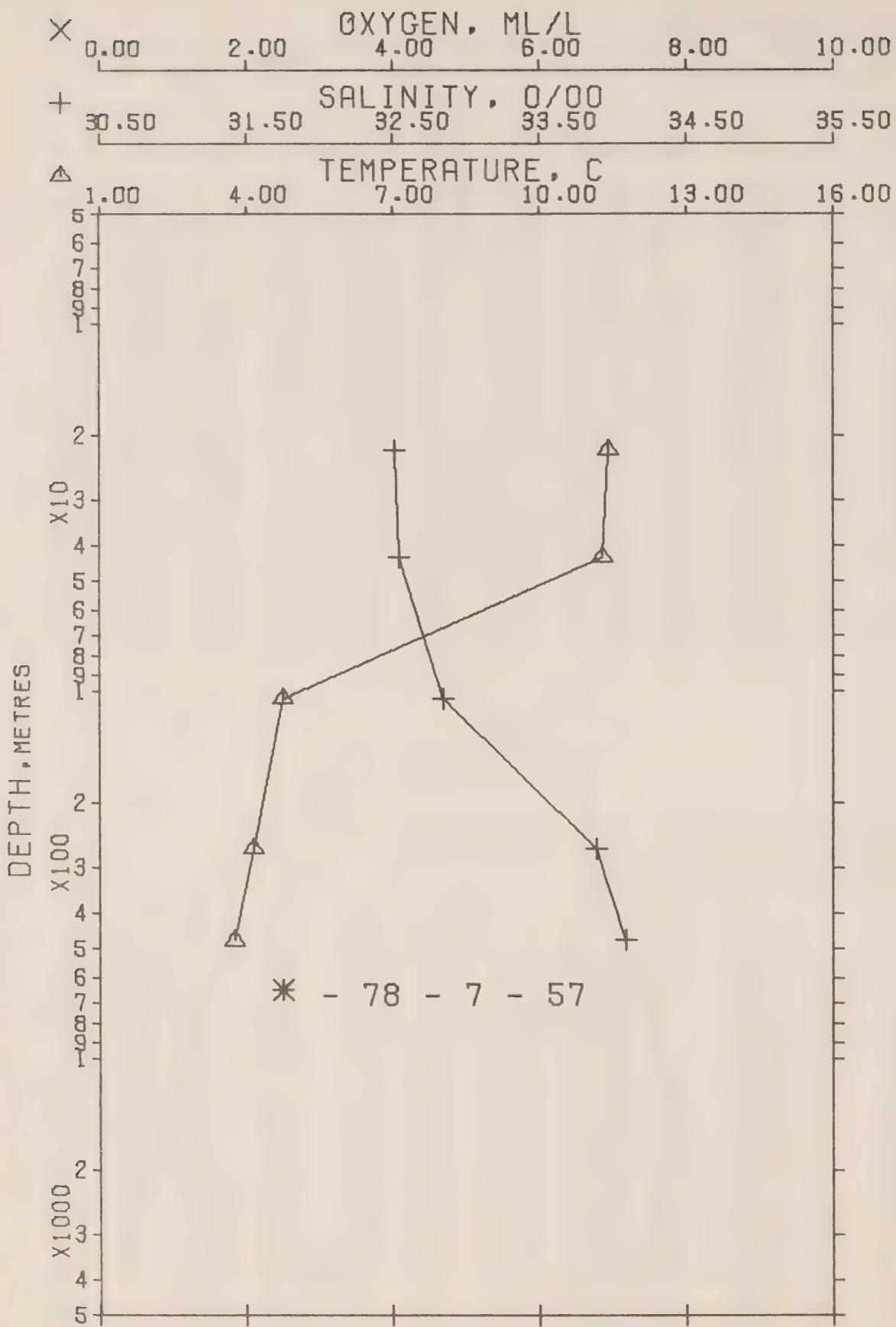
DATE 3/10/78 GMT 18.5

POSITION 50- .0 N, 145- .0 W

STATION P

## INTERPOLATED TO STANDARD PRESSURE

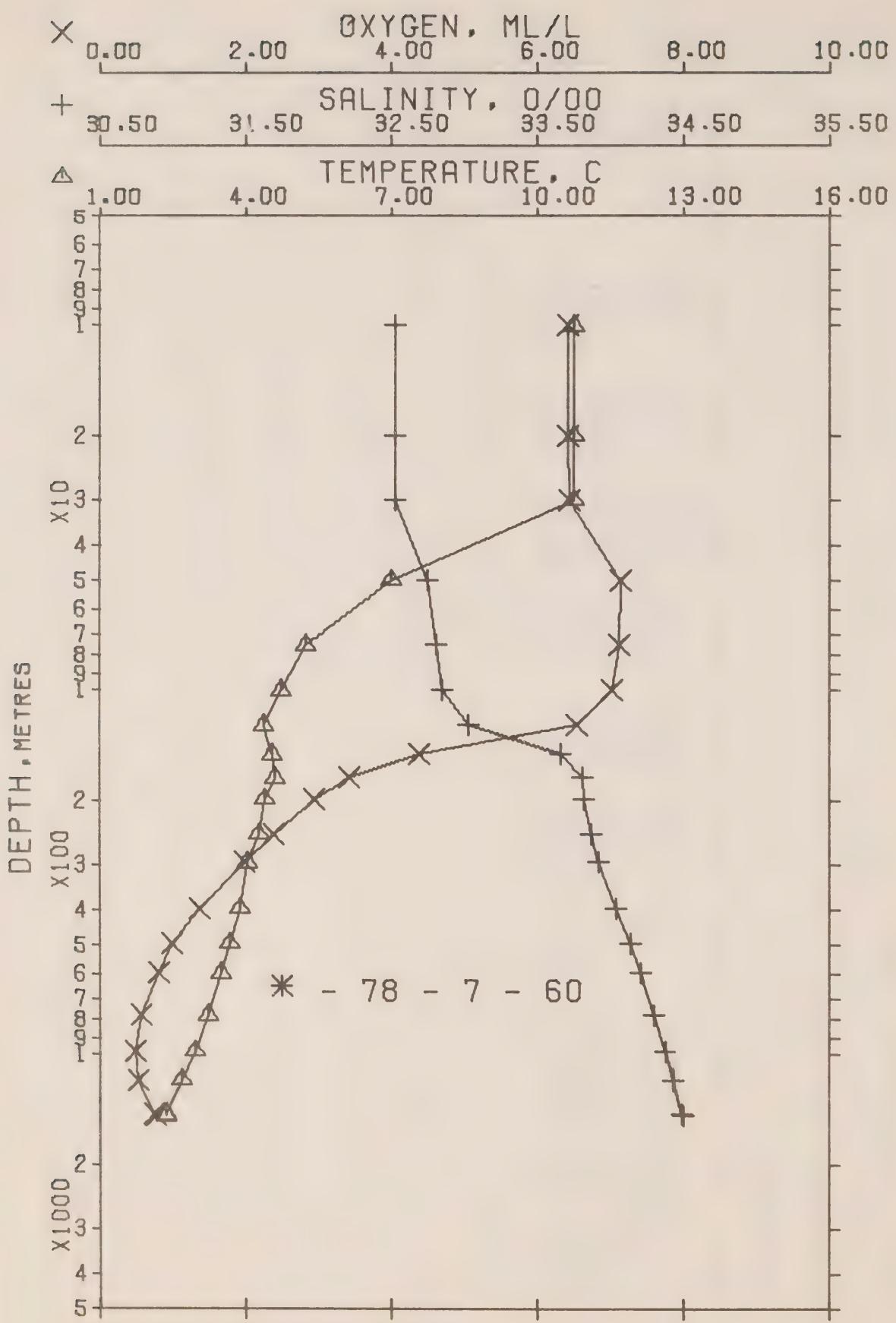
PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	11.51	32.526	0	24.783	317.3	11.51	317.3	.00	.00	6.39	1493.
10	11.45	32.523	10	24.792	316.7	11.45	316.5	.32	.02	6.45	1493.
20	11.42	32.526	20	24.799	316.2	11.42	315.7	.64	.07	6.37	1493.
30	11.42	32.528	30	24.801	316.3	11.42	315.6	.96	.15	6.43	1493.
50	5.97	32.797	50	25.841	217.2	5.97	216.6	1.49	.36	7.20	1473.
75	5.18	32.821	75	25.954	206.7	5.17	205.9	2.00	.69	6.99	1470.
100	4.54	33.031	99	26.190	184.4	4.53	183.5	2.47	1.11	6.40	1468.
125	4.42	33.297	124	26.413	163.4	4.41	162.2	2.91	1.61	5.63	1468.
150	4.53	33.686	149	26.709	135.7	4.52	134.2	3.28	2.13	4.12	1470.
175	4.44	33.811	174	26.818	125.5	4.43	123.8	3.60	2.67	3.20	1470.
200	4.30	33.844	199	26.859	121.8	4.28	119.9	3.91	3.26	2.74	1470.
225	4.20	33.866	223	26.887	119.3	4.18	117.2	4.21	3.91	2.44	1470.
250	4.12	33.887	248	26.912	117.2	4.10	114.8	4.51	4.63	2.21	1470.
300	4.00	33.934	298	26.962	112.8	3.98	110.1	5.08	6.24	1.86	1470.
400	3.82	34.049	397	27.072	103.1	3.79	99.6	6.16	10.08	1.27	1471.
500	3.67	34.131	496	27.151	96.3	3.64	92.0	7.16	14.65	.94	1472.
600	3.48	34.199	595	27.225	89.9	3.43	85.0	8.09	19.86	.76	1473.
700	3.31	34.258	694	27.287	84.5	3.26	79.0	8.96	25.63	.67	1474.
800	3.17	34.309	793	27.341	79.9	3.11	73.9	9.78	31.90	.59	1475.
900	3.09	34.350	892	27.380	76.7	3.03	70.1	10.56	38.68	.57	1477.
1000	2.94	34.388	990	27.424	72.8	2.87	65.9	11.31	45.93	.57	1478.
1200	2.63	34.447	1188	27.499	66.3	2.55	58.7	12.69	61.40	.62	1480.
1500	2.33	34.509	1484	27.574	59.9	2.23	51.5	14.58	87.37	.83	1484.
2000	1.96	34.587	1976	27.666	51.9	1.83	42.5	17.36	136.75	1.44	1491.
2500	1.73	34.633	2467	27.720	47.5	1.56	37.2	19.83	193.44	2.11	1498.
3000	1.58	34.659	2956	27.752	45.1	1.36	33.9	22.13	257.91	2.59	1506.
3500	1.53	34.674	3445	27.768	44.8	1.26	32.1	24.37	331.97	2.83	1514.



OFFSHORE OCEANOGRAPHY GROUP  
REFERENCE NO. 78- 7- 57  
POSITION 50° 0' N. 145° W  
HYDROGRAPHIC CAST DATA

OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA <sub>T</sub>	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	11.45	32.536	0	24.802	315.6	11.45	315.5	.00	.00		1492.
22	11.42	32.519	22	24.794	316.8	11.42	316.2	.70	.08		1493.
43	11.28	32.549	43	24.842	312.6	11.27	311.6	1.37	.30		1493.
105	4.75	32.851	104	26.025	200.1	4.74	199.1	2.88	1.41		1469.
269	4.14	33.887	267	26.910	117.5	4.12	115.0	5.38	5.99		1470.
478	3.77	34.091	474	27.110	100.1	3.74	96.0	7.63	14.51		1472.



OFFSHORE OCEANOGRAPHY GROUP  
 REFERENCE NO. 78- 7- 60  
 POSITION 50- .0 N, 145- .0 W  
 HYDROGRAPHIC CAST DATA

DATE 9/10/78 GMT 18.4

STATION P

## OBSERVED DATA

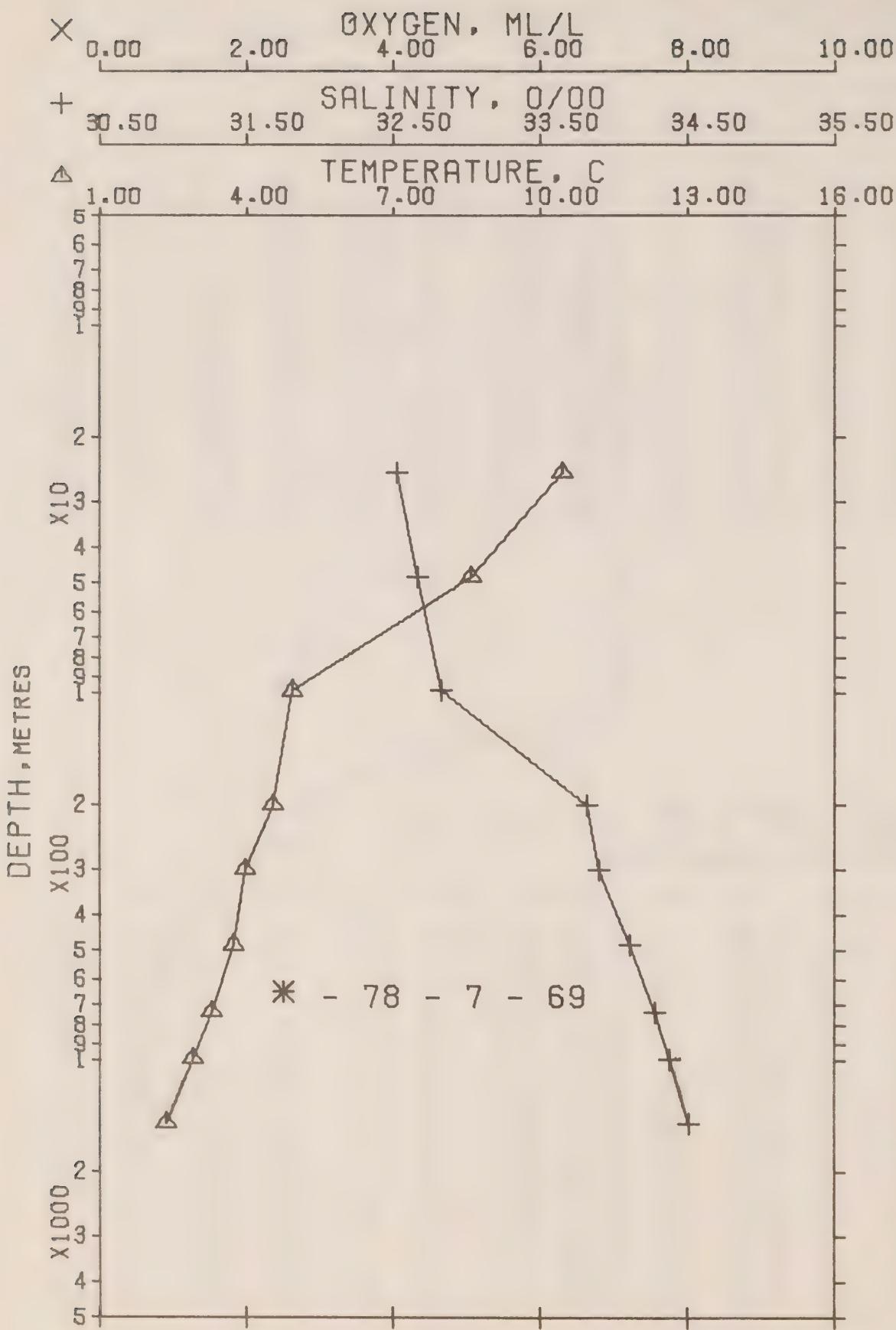
PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	THETA	SVA (THETA)	DELTA	POT.	OXY	SOUND
				T			D	EN			
0	10.76	32.536	0	24.924	303.9	10.76	303.9	.00	.00	6.40	1490.
10	10.76	32.534	10	24.923	304.2	10.76	304.0	.31	.02	6.42	1490.
20	10.74	32.530	20	24.923	304.4	10.74	304.0	.61	.06	6.42	1490.
30	10.75	32.528	30	24.920	304.9	10.75	304.3	.92	.14	6.44	1490.
50	7.00	32.753	50	25.674	233.2	7.00	232.5	1.46	.36	7.14	1477.
75	5.24	32.814	75	25.941	207.9	5.23	207.1	2.01	.71	7.12	1470.
100	4.73	32.853	100	26.029	199.7	4.72	198.8	2.53	1.17	7.03	1469.
125	4.37	33.033	125	26.209	182.7	4.36	181.6	3.01	1.73	6.54	1468.
150	4.54	33.655	150	26.684	138.1	4.53	136.5	3.41	2.30	4.38	1470.
175	4.59	33.807	174	26.799	127.4	4.58	125.6	3.73	2.82	3.42	1471.
200	4.40	33.825	199	26.834	124.3	4.39	122.3	4.04	3.43	2.95	1470.
250	4.28	33.866	248	26.879	120.4	4.26	118.0	4.65	4.81	2.39	1471.
299	4.02	33.923	297	26.951	113.9	4.00	111.1	5.23	6.43	1.97	1470.
399	3.88	34.041	396	27.059	104.4	3.85	100.8	6.32	10.31	1.37	1472.
499	3.68	34.142	495	27.159	95.5	3.64	91.3	7.31	14.86	.98	1473.
602	3.49	34.211	597	27.232	89.2	3.45	84.3	8.26	20.20	.80	1473.
786	3.22	34.295	779	27.325	81.4	3.17	75.4	9.83	31.25	.56	1475.
985	2.96	34.375	976	27.413	73.9	2.89	67.0	11.37	45.18	.48	1478.
1185	2.69	34.433	1173	27.483	67.8	2.61	60.3	12.78	60.78	.53	1480.
1478	2.36	34.490	1462	27.556	61.5	2.26	53.2	14.74	87.52	.74	1483.
1488	2.34	34.501	1472	27.567	60.5	2.24	52.2	14.81	88.46	.76	1484.

OFFSHORE OCEANOGRAPHY GROUP  
 REFERENCE NO. 78- 7- 60  
 POSITION 50- .0 N, 145- .0 W  
 INTERPOLATED TO STANDARD PRESSURE

DATE 9/10/78 GMT 18.4

STATION P

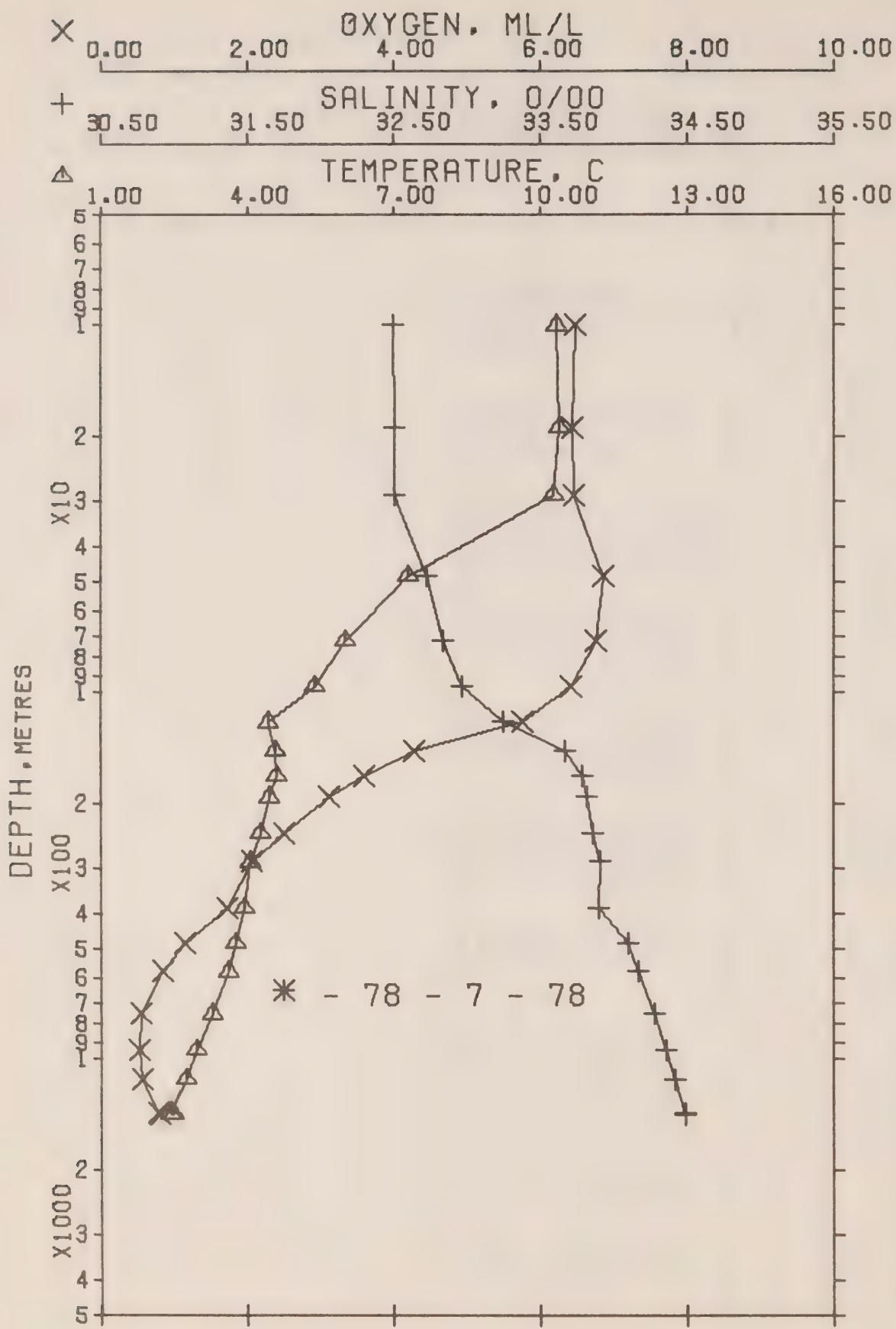
PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	THETA	SVA (THETA)	DELTA	POT.	OXY	SOUND
				T			D	EN			
0	10.76	32.536	0	24.924	303.9	10.76	303.9	.00	.00	6.40	1490.
10	10.76	32.534	10	24.923	304.2	10.76	304.0	.31	.02	6.42	1490.
20	10.74	32.530	20	24.923	304.4	10.74	304.0	.61	.06	6.42	1490.
30	10.75	32.528	30	24.920	304.9	10.75	304.3	.92	.14	6.44	1490.
50	7.00	32.753	50	25.674	233.2	7.00	232.5	1.46	.36	7.14	1477.
75	5.24	32.814	75	25.941	207.9	5.23	207.1	2.01	.71	7.12	1470.
100	4.74	32.852	99	26.027	199.9	4.73	198.9	2.51	1.16	7.03	1469.
125	4.38	33.028	124	26.204	183.2	4.37	182.1	2.99	1.71	6.56	1468.
150	4.53	33.632	149	26.667	139.7	4.52	138.2	3.40	2.28	4.46	1470.
175	4.59	33.807	174	26.799	127.4	4.58	125.6	3.73	2.82	3.42	1471.
200	4.40	33.825	199	26.834	124.3	4.39	122.3	4.04	3.43	2.95	1470.
225	4.34	33.847	223	26.857	122.2	4.32	120.0	4.35	4.08	2.65	1470.
250	4.28	33.866	248	26.879	120.4	4.26	118.0	4.65	4.81	2.39	1471.
300	4.02	33.924	298	26.952	113.8	4.00	111.0	5.23	6.46	1.97	1470.
400	3.88	34.042	397	27.060	104.3	3.85	100.7	6.33	10.34	1.36	1472.
500	3.68	34.143	496	27.160	95.5	3.64	91.2	7.32	14.91	.97	1473.
600	3.49	34.210	595	27.231	89.3	3.45	84.4	8.24	20.08	.80	1473.
700	3.34	34.258	694	27.285	84.7	3.29	79.2	9.11	25.83	.66	1475.
800	3.20	34.301	793	27.332	80.8	3.14	74.7	9.94	32.16	.56	1476.
900	3.06	34.343	892	27.377	76.9	3.00	70.4	10.73	38.99	.51	1477.
1000	2.94	34.380	990	27.418	73.4	2.87	66.5	11.48	46.26	.48	1478.
1200	2.67	34.436	1188	27.487	67.5	2.59	59.9	12.88	62.01	.54	1480.



OFFSHORE OCEANOGRAPHY GROUP  
 REFERENCE NO. 78-7-69 DATE 12/10/78 GMT 18.0  
 POSITION 50° 0' N. 145° 0' W.  
 HYDROGRAPHIC CAST DATA

OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA <sub>T</sub>	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	10.47	32.506	0	24.951	301.3	10.47	301.3	.00	.00	1489.	
25	10.44	32.534	25	24.978	299.3	10.44	298.7	.75	.10	1489.	
48	8.59	32.670	48	25.382	261.1	8.58	260.2	1.40	.34	1483.	
99	4.93	32.826	98	25.986	203.8	4.92	202.9	2.55	1.19	1469.	
201	4.54	33.823	200	26.817	126.0	4.52	123.9	4.20	3.64	1471.	
303	3.98	33.897	301	26.934	115.4	3.96	112.7	5.42	6.78	1470.	
487	3.73	34.115	483	27.133	98.0	3.70	93.8	7.37	14.58	1472.	
740	3.27	34.279	733	27.307	82.8	3.22	77.1	9.64	28.69	1475.	
998	2.90	34.377	988	27.420	73.2	2.83	66.3	11.65	46.40	1478.	
1492	2.35	34.509	1476	27.572	60.0	2.25	51.6	14.92	87.64	1484.	



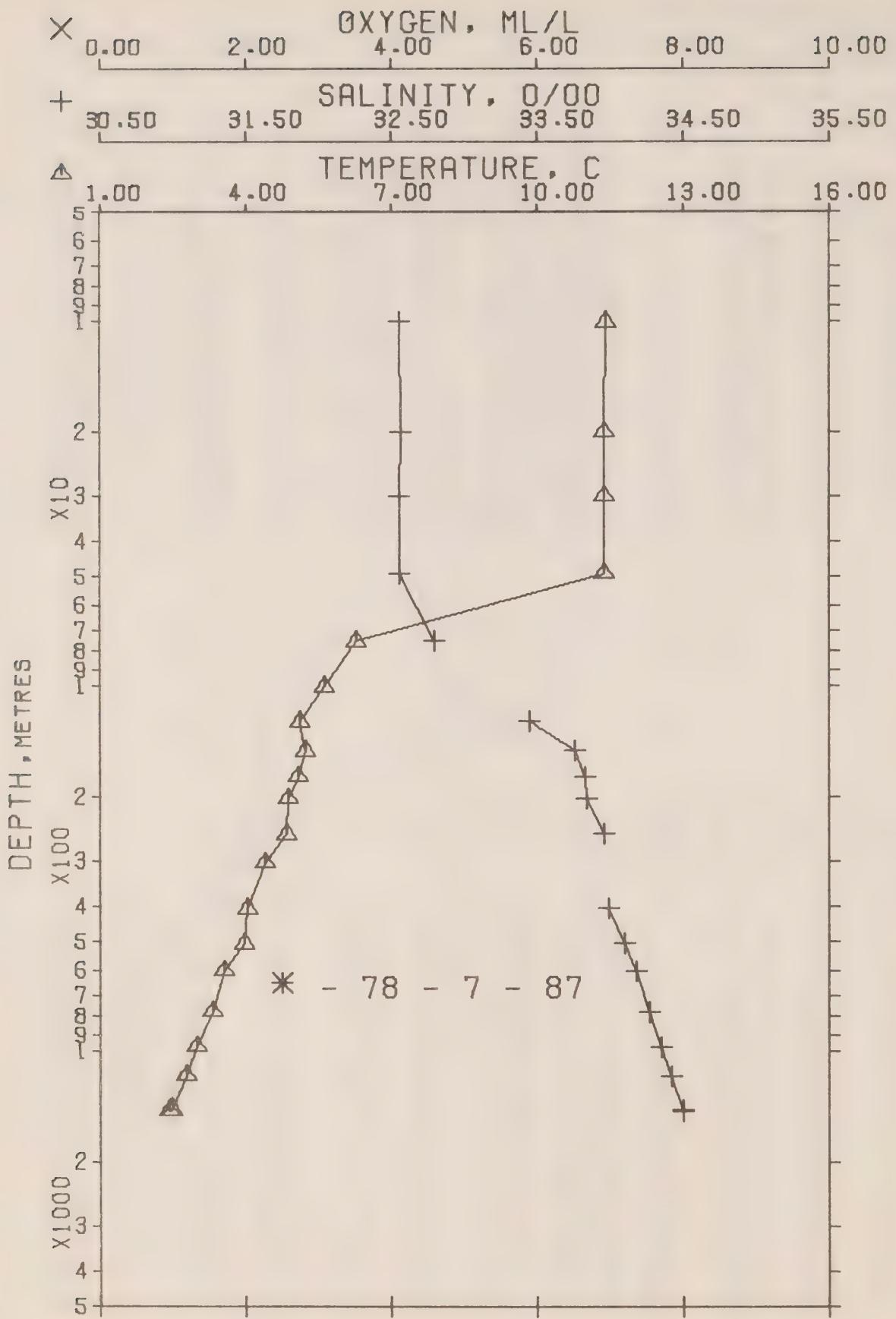
OFFSHORE OCEANOGRAPHY GROUP  
 REFERENCE NO. 78- 7- 78 DATE 16/10/78 GMT 18.2  
 POSITION 50-.0 N, 145-.0 W STATION P  
 HYDROGRAPHIC CAST DATA

## OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SV <sub>A</sub>	THETA	SV <sub>A</sub> (THETA)	DELTA D	POT. EN	OXY	SOUND
0	10.34	32.502	0	24.970	299.5	10.34	299.5	.00	.00	6.42	1488.
10	10.33	32.504	10	24.973	299.4	10.33	299.2	.30	.02	6.47	1489.
19	10.38	32.505	19	24.965	300.3	10.38	299.9	.57	.06	6.45	1489.
29	10.28	32.507	29	24.984	298.8	10.28	298.1	.88	.13	6.46	1489.
48	7.30	32.728	48	25.614	238.9	7.30	238.2	1.39	.33	6.87	1478.
72	6.01	32.837	72	25.868	214.9	6.00	214.0	1.94	.67	0.77	1473.
97	5.37	32.970	96	26.049	197.9	5.36	196.8	2.44	1.10	6.42	1471.
121	4.42	33.246	120	26.373	167.2	4.41	166.1	2.88	1.58	5.77	1468.
145	4.57	33.674	144	26.696	136.9	4.56	135.4	3.24	2.08	4.28	1470.
169	4.60	33.791	168	26.785	128.7	4.59	126.9	3.56	2.59	3.59	1471.
193	4.45	33.823	192	26.827	124.9	4.44	123.0	3.87	3.16	3.12	1470.
243	4.28	33.860	241	26.874	120.8	4.26	118.4	4.48	4.51	2.51	1470.
291	4.05	33.906	289	26.934	115.4	4.03	112.7	5.05	6.05	2.06	1470.
388	3.93	33.903	385	26.944	115.1	3.90	111.7	6.18	9.98	1.73	1471.
484	3.75	34.097	480	27.116	99.5	3.72	95.3	7.20	14.52	1.14	1472.
580	3.61	34.173	575	27.191	93.1	3.57	88.2	8.13	19.53	.85	1474.
759	3.29	34.276	752	27.303	83.3	3.24	77.5	9.70	30.24	.54	1475.
950	2.95	34.362	941	27.403	74.6	2.89	67.9	11.21	43.34	.52	1477.
1142	2.73	34.420	1131	27.469	69.0	2.65	61.6	12.58	58.04	.56	1479.
1421	2.41	34.490	1406	27.552	61.8	2.31	53.6	14.34	80.87	.77	1483.
1430	2.46	34.488	1415	27.546	62.5	2.36	54.1	14.40	81.69	.81	1483.

OFFSHORE OCEANOGRAPHY GROUP  
 REFERENCE NO. 78- 7- 78 DATE 16/10/78 GMT 18.2  
 POSITION 50-.0 N, 145-.0 W STATION P  
 INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	SV <sub>A</sub>	THETA	SV <sub>A</sub> (THETA)	DELTA D	POT. EN	OXY	SOUND
0	10.34	32.502	0	24.970	299.5	10.34	299.5	.00	.00	6.42	1488.
10	10.33	32.504	10	24.973	299.4	10.33	299.2	.30	.02	6.47	1489.
20	10.37	32.505	20	24.967	300.2	10.37	299.7	.60	.06	6.45	1489.
30	10.11	32.519	30	25.022	295.2	10.11	294.6	.90	.14	6.48	1488.
50	7.19	32.737	50	25.637	236.8	7.18	236.1	1.43	.35	6.86	1478.
75	5.93	32.853	75	25.890	212.9	5.93	211.9	1.99	.71	6.72	1473.
100	5.22	33.013	99	26.100	193.1	5.22	192.0	2.50	1.16	6.32	1471.
125	4.45	33.327	124	26.434	161.5	4.44	160.3	2.95	1.67	5.49	1469.
150	4.58	33.700	149	26.715	135.1	4.57	133.5	3.31	2.18	4.13	1470.
175	4.56	33.799	174	26.796	127.7	4.55	125.9	3.64	2.72	3.47	1470.
200	4.42	33.828	199	26.834	124.3	4.41	122.3	3.95	3.32	3.03	1470.
225	4.34	33.848	223	26.858	122.2	4.32	120.0	4.26	3.99	2.71	1470.
250	4.24	33.867	248	26.884	119.9	4.22	117.5	4.56	4.72	2.44	1470.
300	4.04	33.906	298	26.935	115.3	4.02	112.6	5.15	6.36	2.03	1470.
400	3.91	33.930	397	26.968	113.0	3.88	109.4	6.31	10.53	1.65	1472.
500	3.72	34.111	496	27.130	98.4	3.69	94.0	7.36	15.32	1.09	1473.
600	3.57	34.186	595	27.205	91.9	3.53	86.9	8.31	20.64	.81	1474.
700	3.39	34.245	694	27.270	86.3	3.34	80.7	9.20	26.54	.63	1475.
800	3.21	34.296	793	27.327	81.3	3.15	75.2	10.04	32.94	.54	1476.
900	3.03	34.341	892	27.379	76.7	2.97	70.2	10.83	39.77	.52	1477.
1000	2.89	34.378	990	27.421	73.0	2.82	66.2	11.57	47.00	.53	1478.
1200	2.66	34.436	1188	27.488	67.4	2.58	59.8	12.98	62.72	.61	1480.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 87 DATE 22/10/78 GMT 17.7

POSITION 49-49.0 N, 142-40.0 W

STATION 12

## HYDROGRAPHIC CAST DATA

## OBSERVED DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	sva	theta	sva (theta)	delta d	pot. en	oxy	sound
0	11.43	32.563	0	24.826	313.2	11.43	313.2	.00	.00		1492.
10	11.41	32.560	10	24.827	313.3	11.41	313.1	.31	.02		1492.
20	11.37	32.566	20	24.839	312.4	11.37	311.9	.63	.06		1493.
30	11.39	32.561	30	24.832	313.3	11.39	312.6	.94	.15		1493.
49	11.39	32.561	49	24.832	313.7	11.38	312.6	1.57	.40		1493.
75	6.28	32.798	75	25.804	221.1	6.27	220.2	2.26	.84		1475.
101	5.61	33.165	100	26.175	186.1	5.60	184.9	2.77	1.29		1473.
126	5.11	33.450	125	26.458	159.3	5.10	157.9	3.21	1.79		1471.
151	5.22	33.755	150	26.687	138.0	5.21	136.3	3.58	2.32		1473.
177	5.09	33.829	176	26.760	131.3	5.08	129.3	3.93	2.90		1473.
203	4.88	33.839	202	26.792	128.5	4.86	126.2	4.27	3.56		1472.
255	4.83	33.960	253	26.893	119.4	4.81	116.6	4.91	5.05		1473.
306	4.38	33.974	304	26.953	114.0	4.36	110.9	5.50	6.76		1472.
409	4.04	33.995	406	27.006	109.6	4.01	105.8	6.65	10.94		1472.
509	3.98	34.103	505	27.098	101.7	3.94	97.0	7.71	15.89		1474.
606	3.56	34.185	601	27.205	91.9	3.52	86.9	8.65	21.24		1474.
782	3.30	34.274	775	27.301	83.8	3.25	77.7	10.19	32.10		1476.
978	2.98	34.354	969	27.394	75.6	2.91	68.8	11.75	46.08		1478.
1176	2.77	34.421	1164	27.466	69.6	2.69	61.8	13.18	61.80		1480.
1462	2.46	34.498	1446	27.554	61.9	2.36	53.3	15.09	87.50		1484.
1471	2.41	34.499	1455	27.559	61.3	2.31	52.9	15.14	68.34		1484.

## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 87 DATE 22/10/78 GMT 17.7

POSITION 49-49.0 N, 142-40.0 W

STATION 12

## INTERPOLATED TO STANDARD PRESSURE

PRESS	TEMP	SAL	DEPTH	SIGMA T	sva	theta	sva (theta)	delta d	pot. en	oxy	sound
0	11.43	32.563	0	24.826	313.2	11.43	313.2	.00	.00		1492.
10	11.41	32.560	10	24.827	313.3	11.41	313.1	.31	.02		1492.
20	11.37	32.566	20	24.839	312.4	11.37	311.9	.63	.06		1493.
30	11.39	32.561	30	24.832	313.3	11.39	312.6	.94	.15		1493.
50	11.21	32.569	50	24.870	310.1	11.21	309.0	1.59	.41		1492.
75	6.28	32.798	75	25.804	221.1	6.27	220.2	2.26	.84		1475.
100	5.62	33.157	99	26.167	186.8	5.62	185.6	2.76	1.28		1473.
125	5.12	33.442	124	26.450	160.1	5.11	158.7	3.19	1.78		1471.
150	5.22	33.744	149	26.678	138.8	5.20	137.0	3.57	2.30		1473.
175	5.10	33.823	174	26.754	131.8	5.09	129.8	3.90	2.85		1473.
200	4.91	33.838	199	26.788	128.8	4.89	126.6	4.22	3.47		1472.
225	4.86	33.893	223	26.837	124.4	4.84	121.9	4.54	4.16		1473.
250	4.83	33.950	248	26.885	120.2	4.81	117.4	4.85	4.90		1473.
300	4.43	33.972	298	26.947	114.6	4.41	111.5	5.43	6.54		1472.
400	4.07	33.993	397	27.002	109.9	4.04	106.2	6.55	10.52		1472.
500	3.98	34.094	496	27.090	102.4	3.95	97.8	7.61	15.41		1474.
600	3.58	34.180	595	27.199	92.5	3.54	87.4	8.59	20.89		1474.
700	3.41	34.235	694	27.259	87.3	3.36	81.7	9.48	26.80		1475.
800	3.27	34.282	793	27.310	82.9	3.21	76.8	10.34	33.31		1476.
900	3.10	34.324	892	27.359	78.7	3.04	72.1	11.14	40.30		1477.
1000	2.96	34.362	990	27.403	74.9	2.89	67.9	11.91	47.73		1478.
1200	2.74	34.428	1188	27.474	68.8	2.66	61.0	13.35	63.82		1480.



Results of STD Observations

(P-78-7)

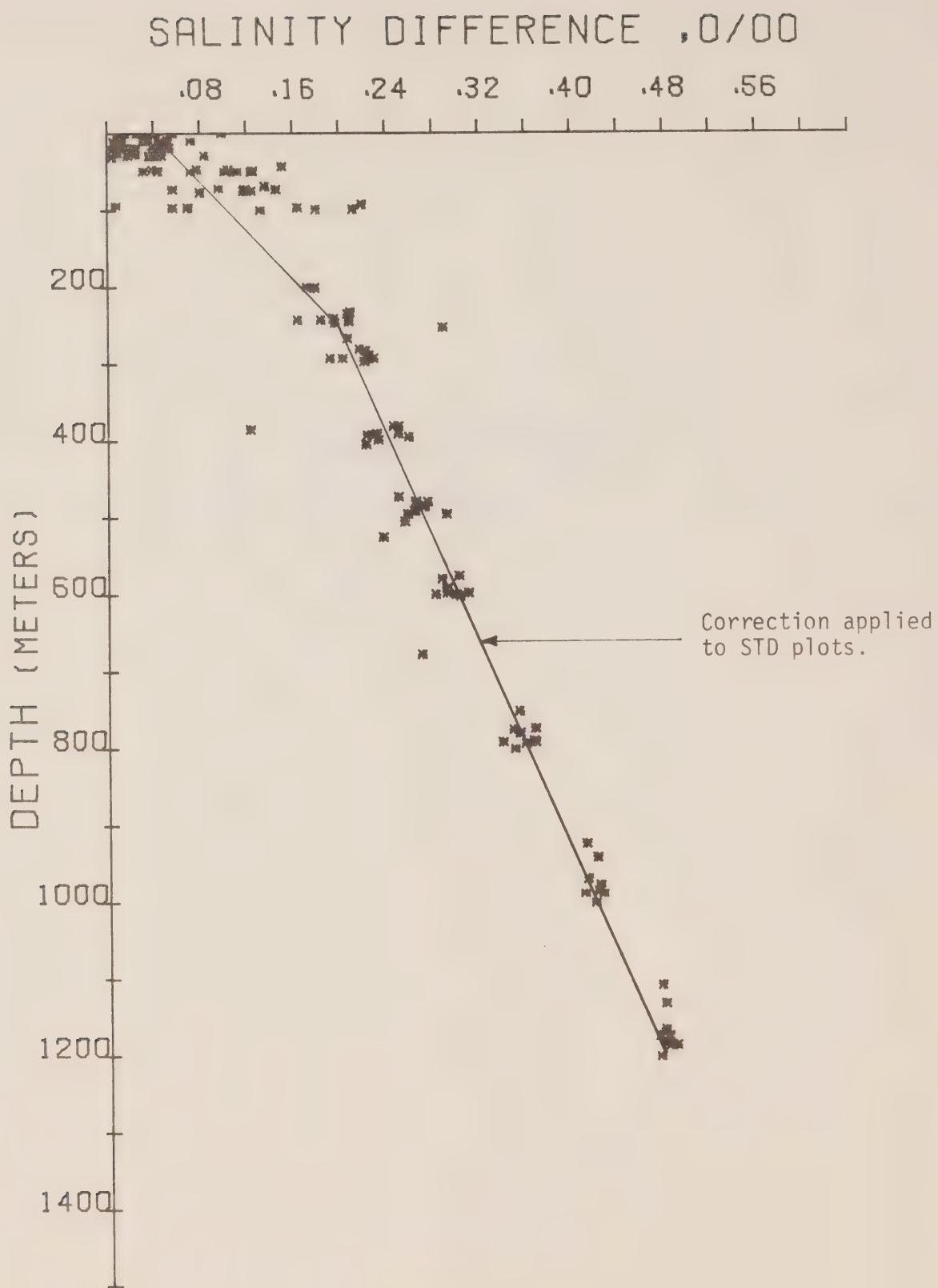


Figure 7. Salinity difference between hydro data and STD.

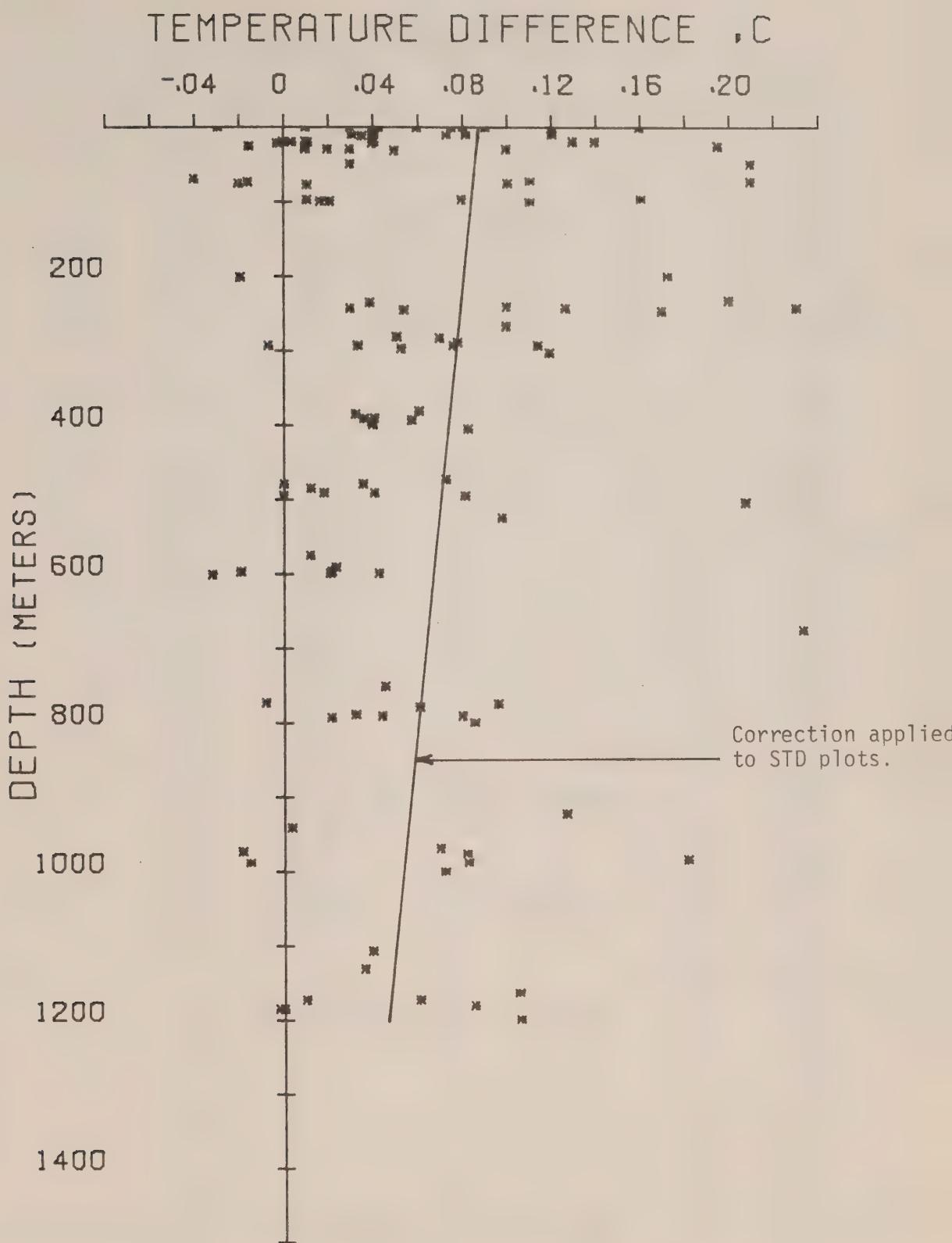
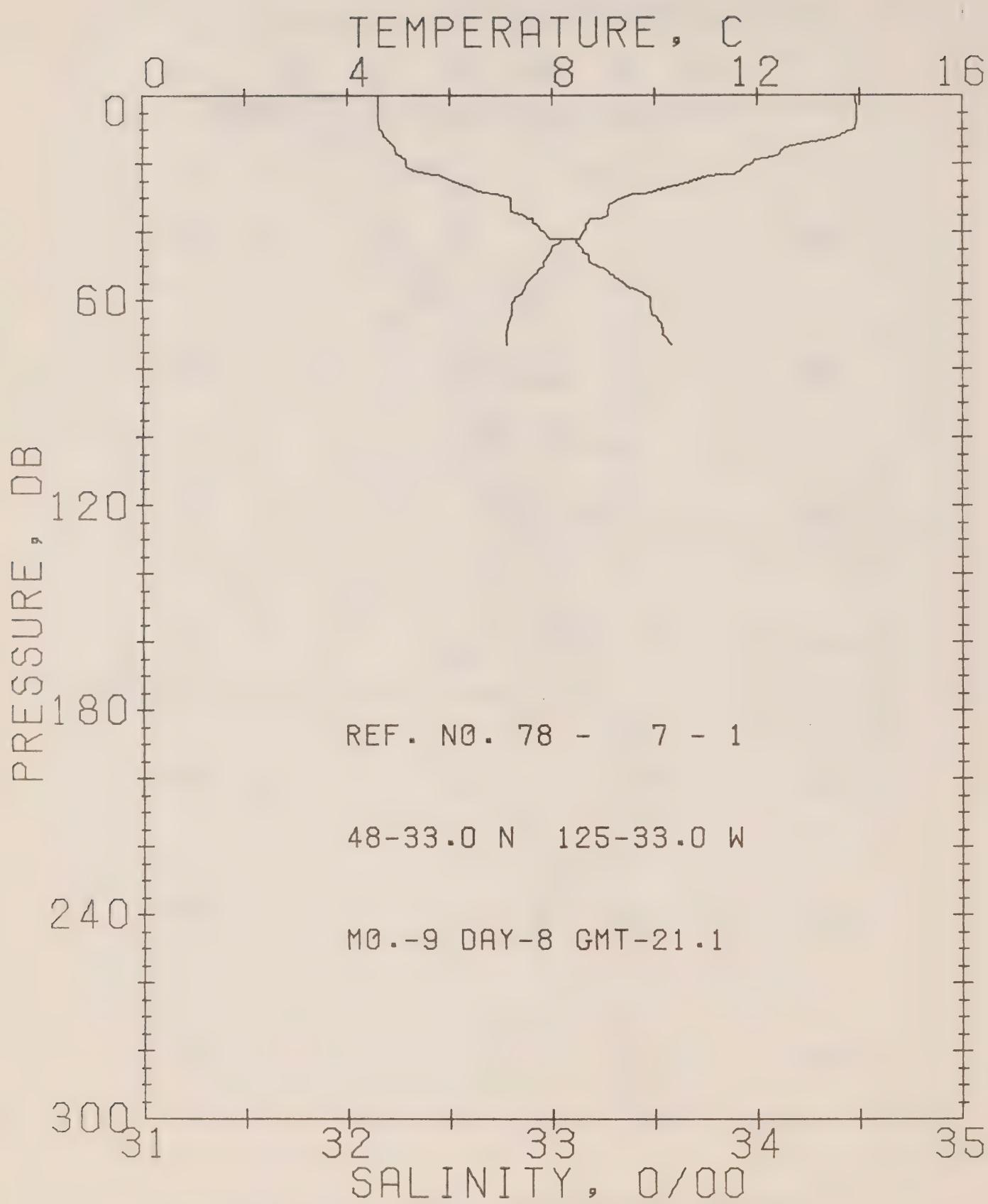


Figure 8. Temperature difference between hydro data and STD.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78-7-1

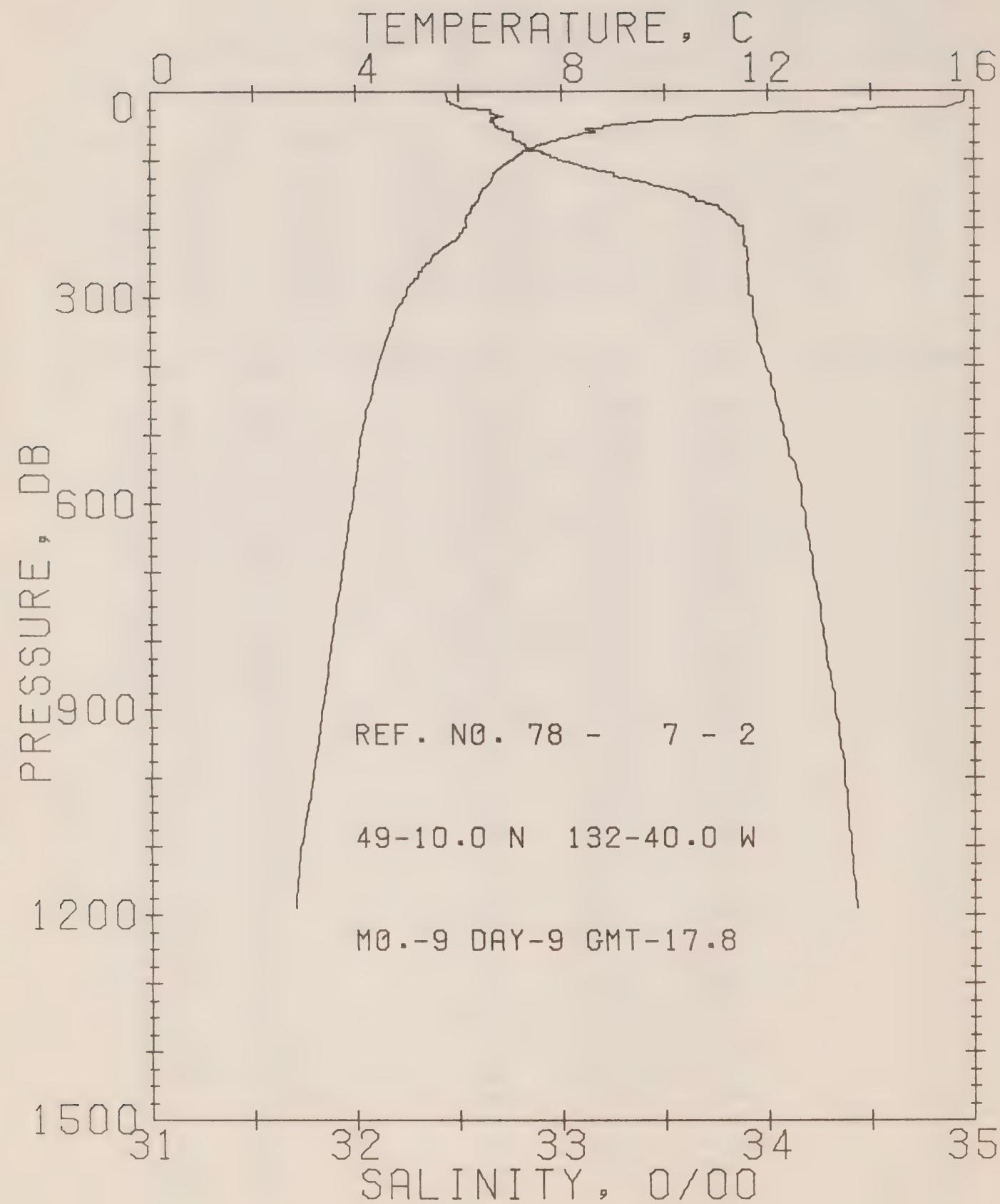
DATE 8/9/78

POSITION 48-33.0N, 125-33.0W GMT 21.1

RESULTS OF STP CAST 70 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	13.93	32.15	0	24.03	389.5	.00	.00	1500.
10	13.93	32.16	10	24.03	389.0	.39	.02	1501.
20	11.92	32.29	20	24.53	342.3	.75	.08	1494.
30	9.39	32.80	30	25.36	263.1	1.06	.15	1486.
50	7.85	33.22	50	25.92	209.8	1.53	.34	1481.
75	7.10	33.60	75	26.33	171.8	2.01	.64	1479.

PRES	DEPTH	TEMP	SAL	PRES	DEPTH	TEMP	SAL
0.		13.93	32.15	38.		8.68	32.93
5.		13.94	32.15	39.		8.67	32.94
7.		13.94	32.15	40.		8.62	32.96
10.		13.93	32.16	42.		8.55	32.99
11.		13.73	32.17	42.		8.22	33.12
12.		13.63	32.18	43.		8.15	33.12
13.		13.29	32.20	44.		8.03	33.13
14.		12.95	32.21	45.		7.99	33.15
15.		12.57	32.23	46.		7.97	33.15
16.		12.52	32.23	47.		7.94	33.18
16.		12.49	32.23	48.		7.89	33.18
17.		12.45	32.24	49.		7.85	33.18
18.		12.32	32.27	50.		7.85	33.22
19.		11.96	32.29	51.		7.75	33.26
20.		11.92	32.29	52.		7.70	33.28
21.		11.77	32.29	53.		7.63	33.31
22.		11.68	32.32	54.		7.56	33.33
23.		11.57	32.42	55.		7.52	33.35
23.		11.28	32.44	56.		7.50	33.37
24.		10.95	32.47	57.		7.47	33.41
25.		10.72	32.52	58.		7.43	33.45
26.		10.56	32.55	59.		7.29	33.48
27.		10.29	32.59	60.		7.28	33.48
28.		10.03	32.63	61.		7.23	33.48
29.		9.83	32.71	62.		7.22	33.48
29.		9.59	32.73	64.		7.22	33.49
30.		9.39	32.80	65.		7.20	33.51
31.		9.24	32.80	66.		7.18	33.52
32.		9.13	32.80	67.		7.15	33.53
33.		9.13	32.80	68.		7.15	33.53
34.		9.10	32.80	68.		7.14	33.54
35.		9.09	32.87	69.		7.13	33.54
36.		8.98	32.88	70.		7.13	33.54
36.		8.78	32.91	71.		7.12	33.56
37.		8.71	32.91	73.		7.11	33.58



## OFFSHORE OCEANOGRAPHY GROUP

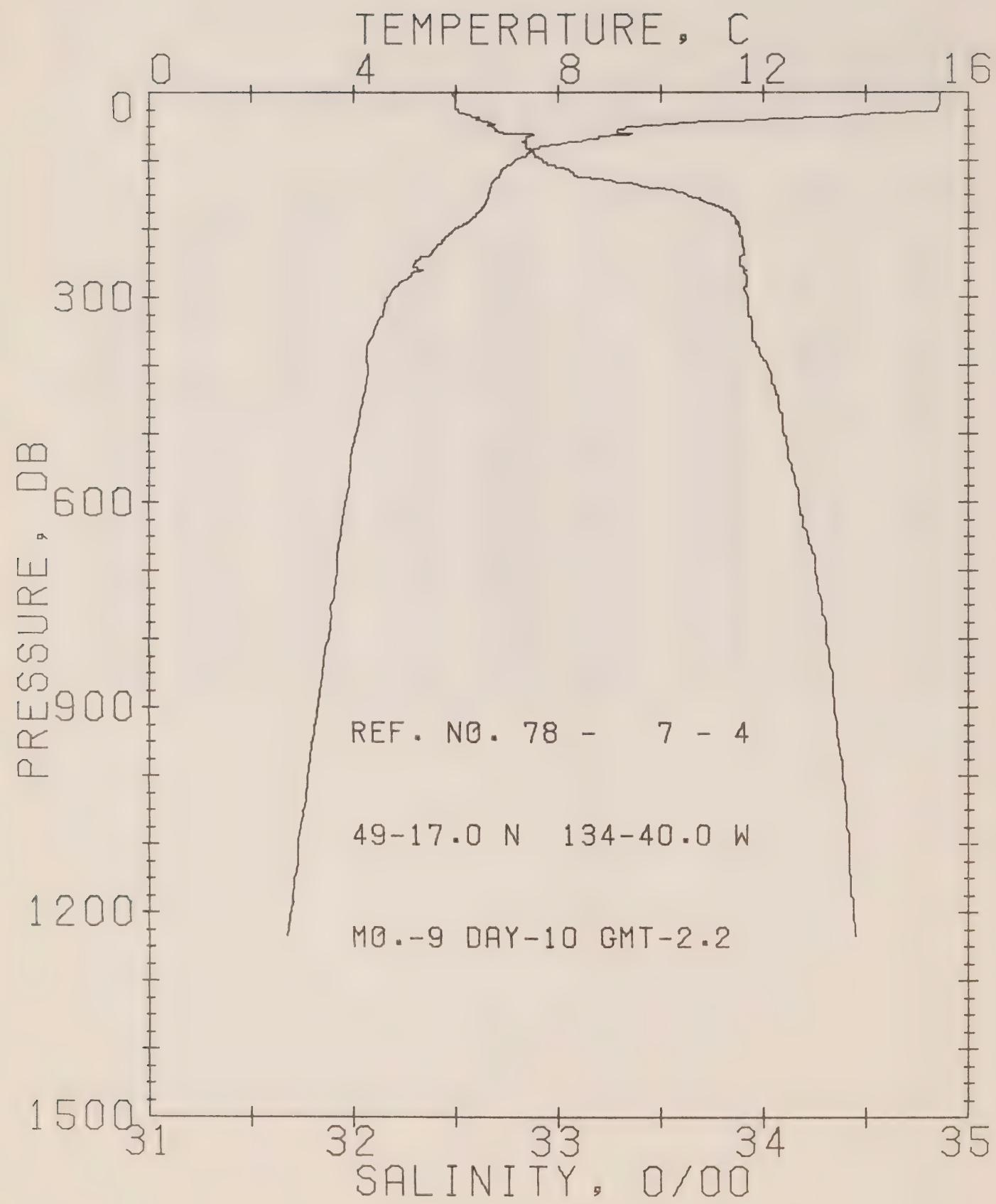
REFERENCE NO. 78- 7- 2 DATE 9/ 9/78

POSITION 49-10.0N, 132-40.0W GMT 17.8

RESULTS OF STP CAST 352 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	15.83	32.44	0	23.84	407.0	.00	.00	1507.
10	15.81	32.45	10	23.85	406.1	.41	.02	1507.
20	15.59	32.49	20	23.93	398.8	.81	.08	1507.
30	13.29	32.66	30	24.55	340.5	1.18	.18	1499.
50	8.88	32.68	50	25.35	264.7	1.76	.41	1484.
75	7.69	32.81	75	25.62	238.4	2.39	.81	1480.
100	7.02	32.98	99	25.85	217.2	2.96	1.31	1478.
125	6.66	33.27	124	26.13	191.2	3.46	1.89	1477.
150	6.41	33.61	149	26.43	163.1	3.90	2.51	1477.
175	6.23	33.79	174	26.59	147.8	4.29	3.15	1477.
200	6.10	33.88	199	26.68	139.8	4.65	3.84	1477.
225	5.74	33.88	223	26.73	135.3	4.99	4.58	1470.
250	5.40	33.90	248	26.78	130.4	5.32	5.38	1475.
300	4.94	33.93	298	26.85	123.7	5.96	7.16	1474.
400	4.43	33.99	397	26.96	114.1	7.15	11.40	1474.
500	4.10	34.07	496	27.06	105.4	8.24	16.41	1474.
600	3.93	34.16	595	27.15	97.7	9.25	22.05	1475.
800	3.52	34.27	793	27.28	86.2	11.09	35.11	1477.
1000	3.15	34.37	991	27.39	76.4	12.71	49.97	1479.
1200	2.80	34.43	1188	27.47	69.4	14.17	66.25	1481.



## OFFSHORE OCEANOGRAPHY GROUP

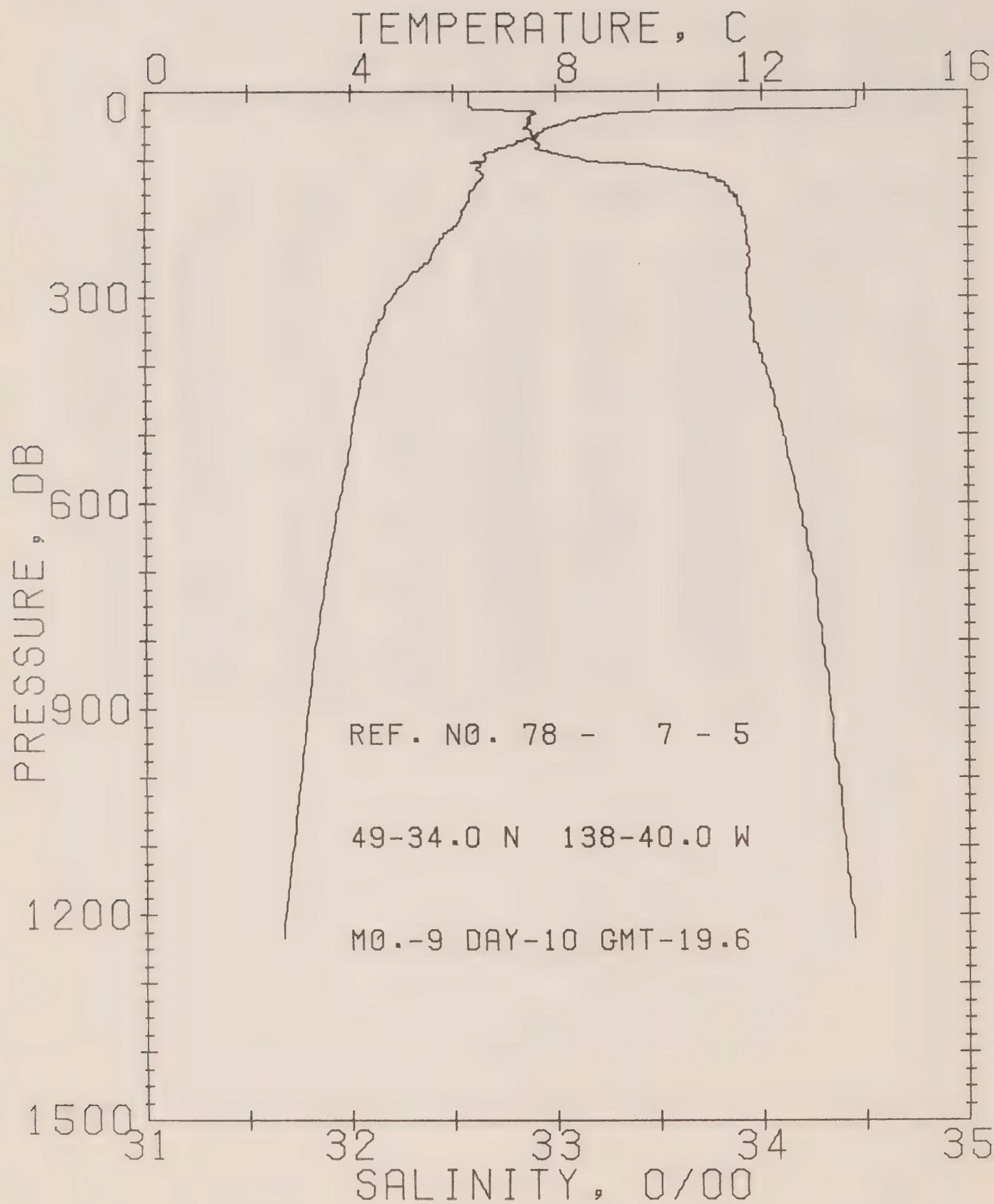
REFERENCE NO. 78- 7- 4 DATE 10/ 9/78

POSITION 49-17.0N, 134-40.0W GMT 2.2

RESULTS OF STP CAST 417 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	15.44	32.49	0	23.97	395.1	.00	.00	1506.
10	15.43	32.50	10	23.98	394.4	.39	.02	1506.
20	15.42	32.50	20	23.98	394.6	.79	.08	1506.
30	14.61	32.52	30	24.17	376.7	1.18	.18	1504.
50	9.43	32.68	50	25.26	273.0	1.82	.44	1486.
75	8.01	32.85	75	25.61	239.9	2.46	.84	1481.
100	7.14	32.93	99	25.79	222.5	3.04	1.36	1479.
125	6.80	33.16	124	26.02	201.3	3.57	1.97	1478.
150	6.64	33.62	149	26.41	165.0	4.02	2.60	1478.
175	6.44	33.84	174	26.60	147.1	4.41	3.24	1478.
200	5.99	33.89	199	26.70	137.7	4.77	3.92	1477.
225	5.64	33.90	223	26.75	133.0	5.11	4.65	1476.
250	5.21	33.89	248	26.80	128.9	5.43	5.45	1474.
300	4.68	33.93	298	26.88	120.6	6.06	7.20	1473.
400	4.29	34.02	397	27.00	110.4	7.22	11.33	1473.
500	4.06	34.10	496	27.09	102.8	8.28	16.20	1474.
600	3.84	34.17	595	27.16	96.0	9.27	21.74	1475.
800	3.52	34.31	793	27.31	83.6	11.05	34.40	1477.
1000	3.10	34.39	991	27.41	74.4	12.63	48.81	1479.
1200	2.77	34.44	1188	27.48	68.3	14.05	64.75	1481.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 5 DATE 10/ 9/78

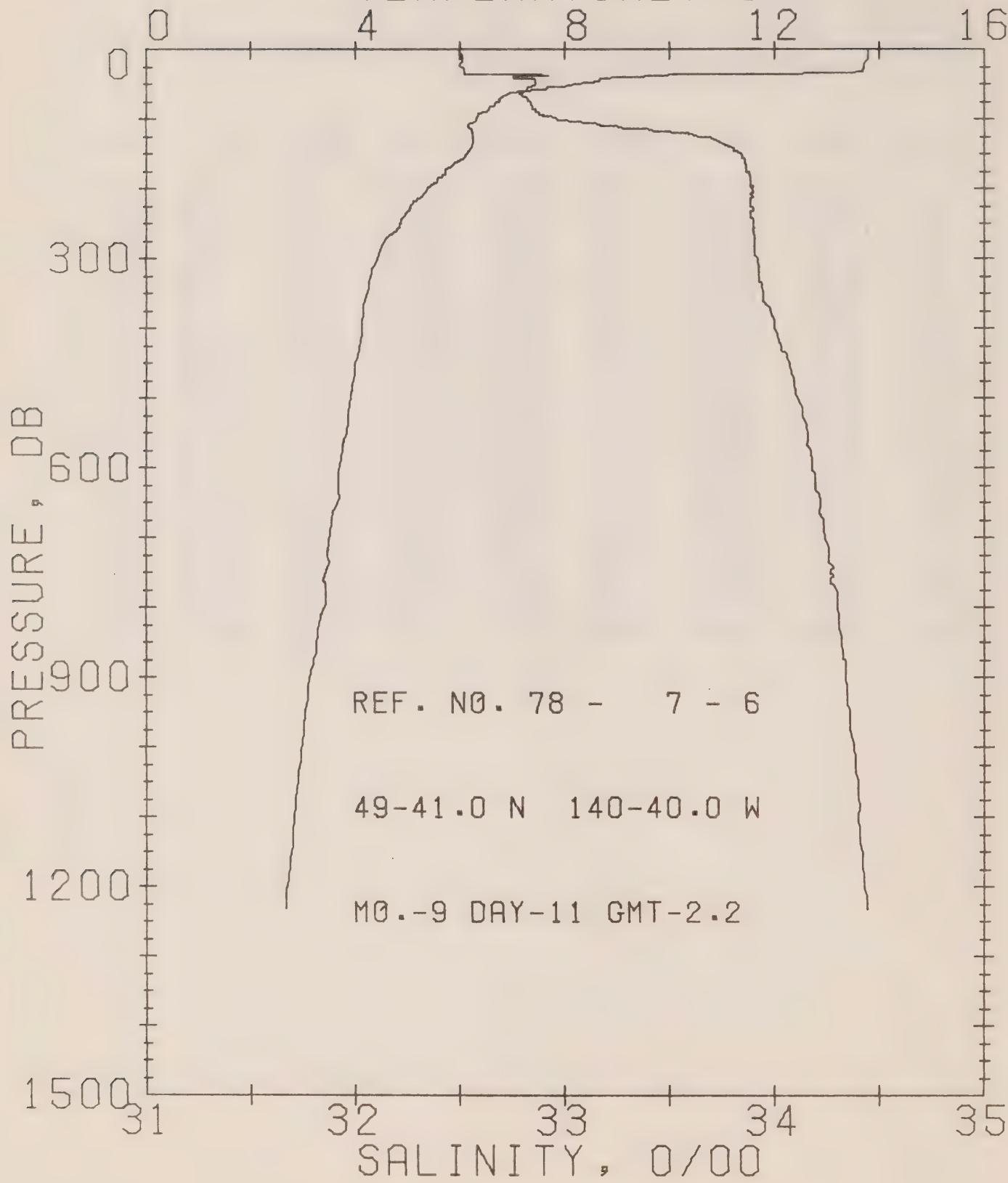
POSITION 49-34.0N, 138-40.0W GMT 19.6

RESULTS OF STP CAST 399 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	13.85	32.58	0	24.37	356.4	.00	.00	1501.
10	13.85	32.58	10	24.37	356.7	.36	.02	1501.
20	13.84	32.58	20	24.37	356.7	.71	.07	1501.
30	9.50	32.90	30	25.42	257.4	1.04	.16	1486.
50	8.00	32.87	50	25.63	237.9	1.53	.35	1481.
75	7.22	32.92	75	25.78	224.0	2.11	.72	1478.
100	6.63	33.13	99	26.02	201.0	2.65	1.20	1477.
125	6.60	33.74	124	26.50	155.5	3.07	1.69	1478.
150	6.31	33.86	149	26.64	143.3	3.44	2.20	1477.
175	6.17	33.90	174	26.68	138.9	3.80	2.79	1477.
200	6.00	33.93	199	26.73	134.8	4.14	3.44	1477.
225	5.67	33.93	223	26.77	130.9	4.47	4.16	1476.
250	5.48	33.94	248	26.80	128.4	4.79	4.95	1476.
300	4.81	33.93	298	26.88	121.6	5.42	6.70	1474.
400	4.29	34.01	397	26.99	111.1	6.58	10.83	1473.
500	4.01	34.10	496	27.09	102.2	7.64	15.70	1474.
600	3.76	34.17	595	27.17	95.1	8.63	21.22	1475.
800	3.32	34.29	793	27.31	82.9	10.39	33.77	1476.
1000	3.01	34.37	990	27.40	74.9	11.97	48.20	1478.
1200	2.69	34.44	1188	27.49	67.4	13.40	64.19	1480.

TEMPERATURE, C



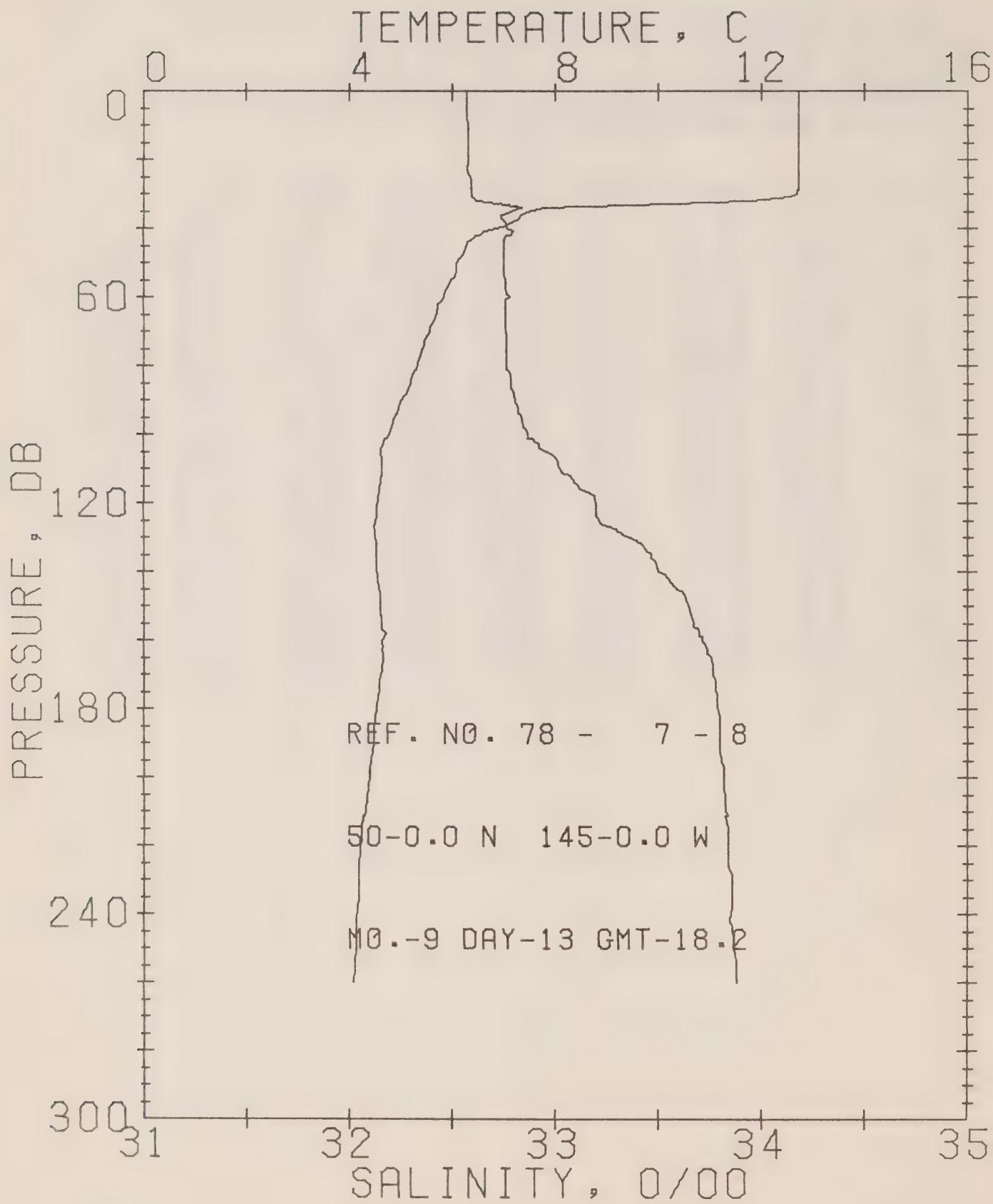
OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 6 DATE 11/ 9/78

POSITION 49-41.0N, 140-40.0W GMT 2.2

RESULTS OF STP CAST 370 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	DELTA	POT.	SOUND
				T		D	EN	
0	13.80	32.50	0	24.32	361.3	.00	.00	1500.
10	13.80	32.51	10	24.33	360.8	.36	.02	1501.
20	13.73	32.51	20	24.34	360.1	.72	.07	1501.
30	13.68	32.52	30	24.36	358.2	1.08	.17	1501.
50	8.27	32.87	50	25.59	241.7	1.64	.39	1482.
75	6.74	32.84	75	25.78	223.7	2.22	.76	1476.
100	6.32	32.96	99	25.93	209.5	2.77	1.24	1475.
125	6.28	33.64	124	26.47	158.9	3.23	1.77	1476.
150	6.13	33.84	149	26.64	142.5	3.60	2.29	1477.
175	5.74	33.87	174	26.72	135.8	3.95	2.86	1475.
200	5.38	33.89	199	26.78	130.2	4.28	3.50	1474.
225	5.08	33.89	223	26.81	127.2	4.60	4.19	1474.
250	4.86	33.90	248	26.84	124.2	4.91	4.95	1473.
300	4.44	33.92	298	26.90	118.7	5.52	6.65	1472.
400	4.13	34.00	397	27.00	110.1	6.66	10.72	1473.
500	3.91	34.11	496	27.11	100.6	7.71	15.53	1473.
600	3.70	34.18	595	27.19	93.7	8.68	20.94	1474.
800	3.40	34.30	793	27.31	83.0	10.44	33.47	1476.
1000	2.98	34.38	990	27.42	73.8	12.00	47.76	1478.
1200	2.69	34.43	1188	27.48	68.1	13.42	63.64	1480.



OFFSHORE OCEANOGRAPHY GROUP

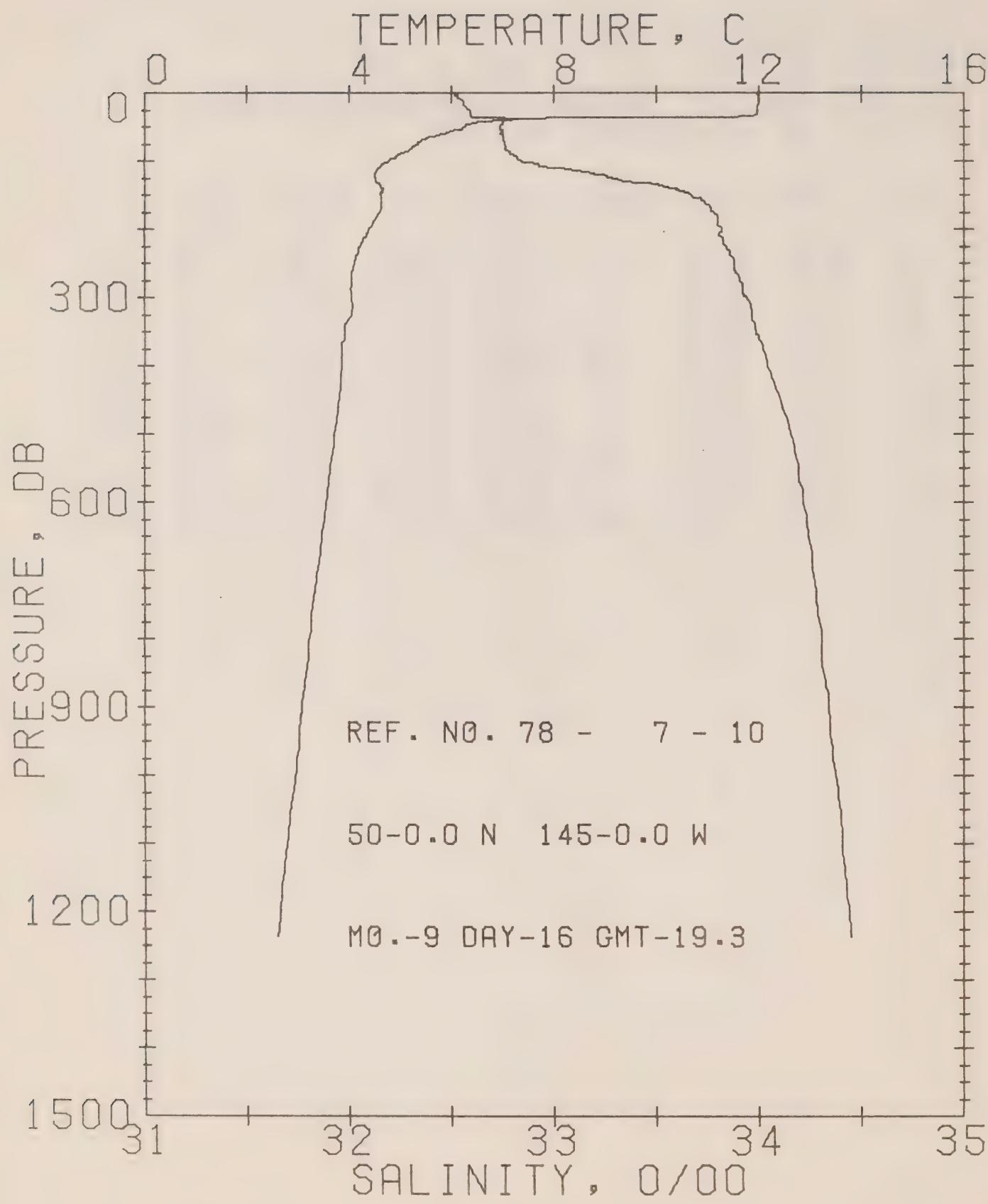
REFERENCE NO. 78- 7- 8 DATE 13/ 9/78

POSITION 50- .0N, 145- .0W GMT 18.2

RESULTS OF STP CAST 186 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.72	32.57	0	24.59	335.7	.00	.00	1497.
10	12.72	32.58	10	24.60	335.4	.34	.02	1497.
20	12.72	32.58	20	24.60	335.4	.67	.07	1497.
30	12.69	32.59	30	24.61	334.4	1.01	.15	1497.
50	6.09	32.75	50	25.79	222.1	1.49	.35	1473.
75	5.42	32.77	75	25.89	213.2	2.04	.70	1471.
100	4.77	32.87	99	26.04	198.9	2.56	1.16	1469.
125	4.50	33.21	124	26.34	170.8	3.01	1.68	1469.
150	4.61	33.64	149	26.67	139.5	3.39	2.21	1470.
175	4.57	33.78	174	26.78	129.0	3.73	2.76	1470.
200	4.39	33.82	199	26.83	124.6	4.04	3.37	1470.
225	4.20	33.84	223	26.87	121.3	4.35	4.03	1470.
250	4.13	33.87	248	26.90	118.5	4.65	4.76	1470.



## OFFSHORE OCEANOGRAPHY GROUP

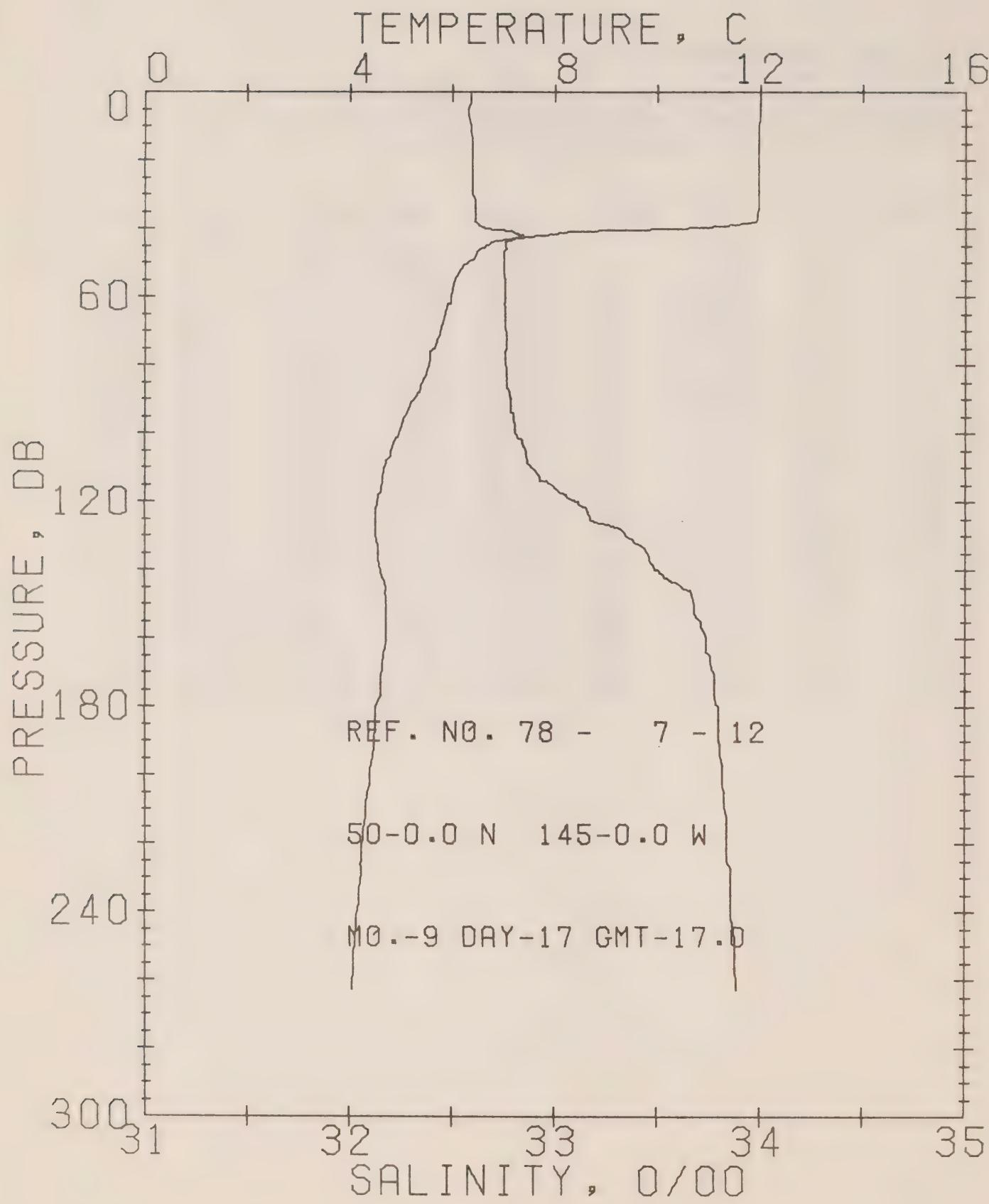
REFERENCE NO. 78- 7- 10 DATE 16/ 9/78

POSITION 50- .0N, 145- .0W GMT 19.3

RESULTS OF STP CAST 285 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.99	32.51	0	24.68	326.9	.00	.00	1494.
10	12.00	32.55	10	24.71	324.4	.33	.02	1495.
20	11.98	32.57	20	24.73	322.8	.65	.07	1495.
30	11.97	32.59	30	24.75	321.3	.97	.15	1495.
50	6.26	32.74	50	25.76	224.9	1.48	.35	1474.
75	5.35	32.76	75	25.89	213.1	2.03	.70	1471.
100	4.77	32.85	99	26.02	200.4	2.55	1.16	1469.
125	4.53	33.28	124	26.39	165.5	3.00	1.68	1469.
150	4.62	33.66	149	26.68	138.2	3.37	2.20	1470.
175	4.59	33.78	174	26.78	129.7	3.71	2.75	1471.
200	4.40	33.82	199	26.83	124.6	4.02	3.36	1470.
225	4.21	33.84	223	26.87	121.4	4.33	4.03	1470.
250	4.10	33.88	248	26.91	117.5	4.63	4.75	1470.
300	4.05	33.94	298	26.96	113.2	5.21	6.36	1471.
400	3.87	34.04	397	27.06	104.4	6.29	10.22	1472.
500	3.72	34.15	496	27.16	95.2	7.29	14.78	1473.
600	3.55	34.21	595	27.23	89.9	8.21	19.94	1474.
800	3.22	34.31	793	27.34	80.3	9.90	32.00	1476.
1000	2.94	34.38	990	27.42	73.6	11.45	46.15	1478.
1200	2.64	34.44	1188	27.49	66.9	12.85	61.81	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 12

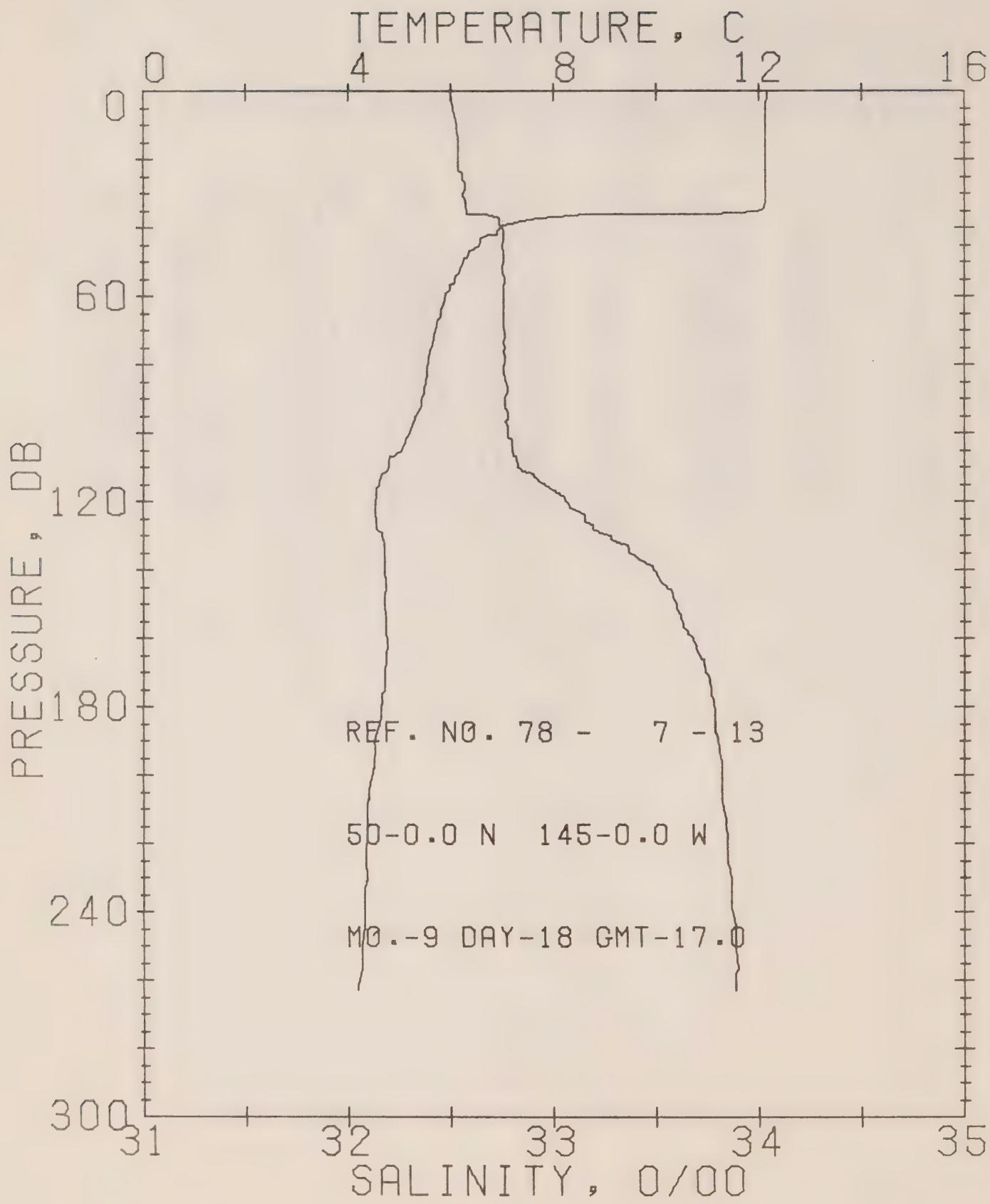
DATE 17/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 185 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.99	32.59	0	24.74	321.0	.00	.00	1494.
10	11.98	32.59	10	24.75	321.1	.32	.02	1495.
20	11.98	32.60	20	24.75	320.5	.64	.07	1495.
30	11.97	32.60	30	24.76	320.6	.96	.15	1495.
50	6.29	32.75	50	25.76	224.5	1.51	.37	1474.
75	5.66	32.77	75	25.86	215.9	2.06	.72	1472.
100	4.96	32.81	99	25.97	205.4	2.59	1.19	1470.
125	4.50	33.17	124	26.30	173.8	3.07	1.73	1469.
150	4.71	33.68	149	26.69	138.0	3.45	2.26	1470.
175	4.60	33.78	174	26.78	129.6	3.78	2.82	1471.
200	4.39	33.82	199	26.83	124.6	4.10	3.42	1470.
225	4.23	33.84	223	26.86	121.6	4.41	4.09	1470.
250	4.10	33.88	248	26.91	117.5	4.70	4.81	1470.



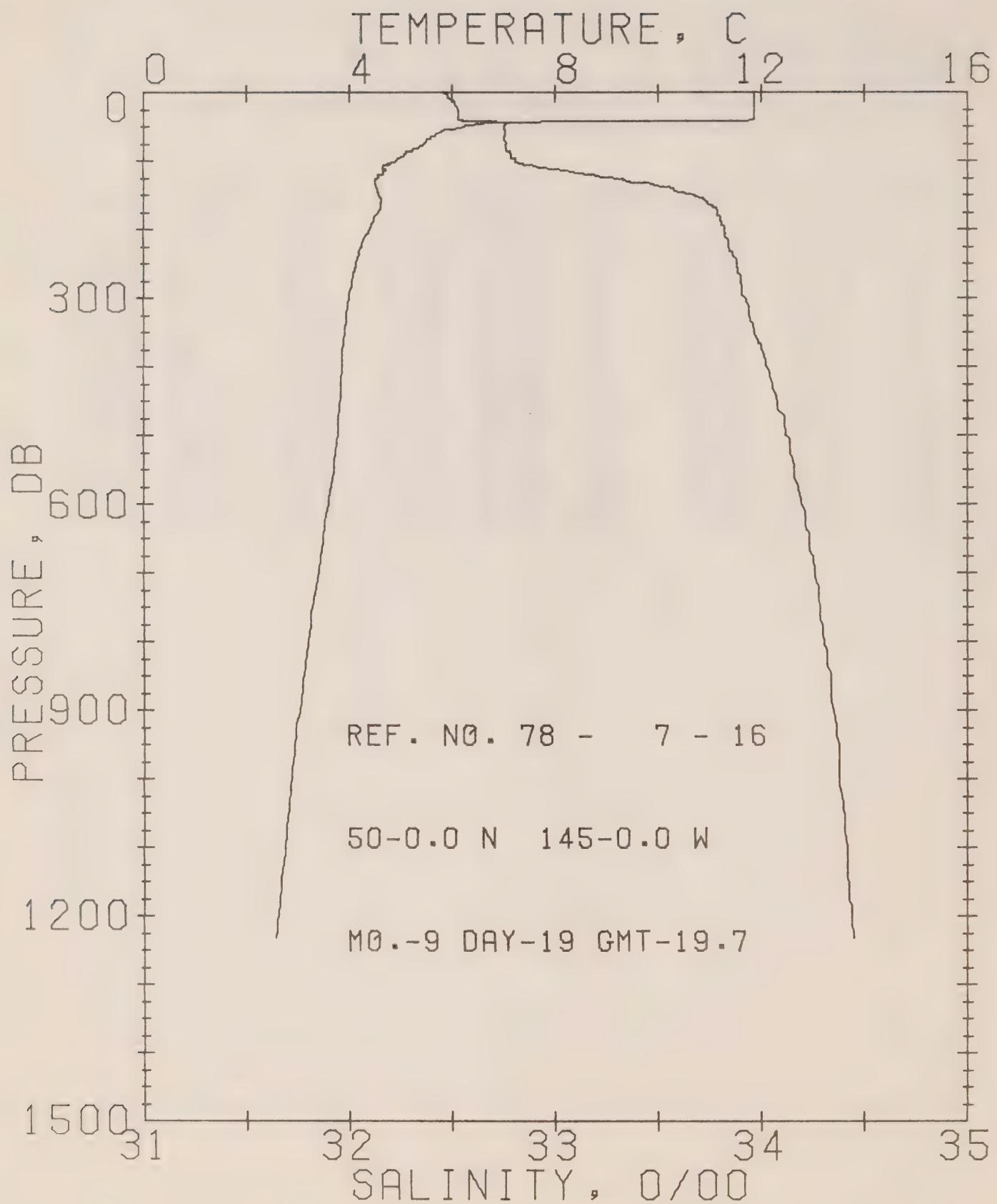
OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 13 DATE 18/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 203 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.15	32.50	0	24.64	330.5	.00	.00	1495.
10	12.14	32.53	10	24.67	328.3	.33	.02	1495.
20	12.14	32.54	20	24.68	327.8	.66	.07	1495.
30	12.13	32.56	30	24.69	326.4	.98	.15	1495.
50	6.23	32.76	50	25.78	223.1	1.50	.36	1474.
75	5.64	32.77	75	25.86	215.7	2.05	.71	1472.
100	5.19	32.78	99	25.92	210.1	2.58	1.18	1470.
125	4.55	33.15	124	26.28	175.8	3.07	1.74	1469.
150	4.73	33.60	149	26.62	144.2	3.47	2.29	1470.
175	4.71	33.77	174	26.76	131.5	3.81	2.86	1471.
200	4.47	33.82	199	26.82	125.4	4.13	3.47	1471.
225	4.35	33.85	223	26.86	122.1	4.44	4.14	1470.
250	4.27	33.89	248	26.90	118.5	4.74	4.87	1471.



OFFSHORE OCEANOGRAPHY GROUP

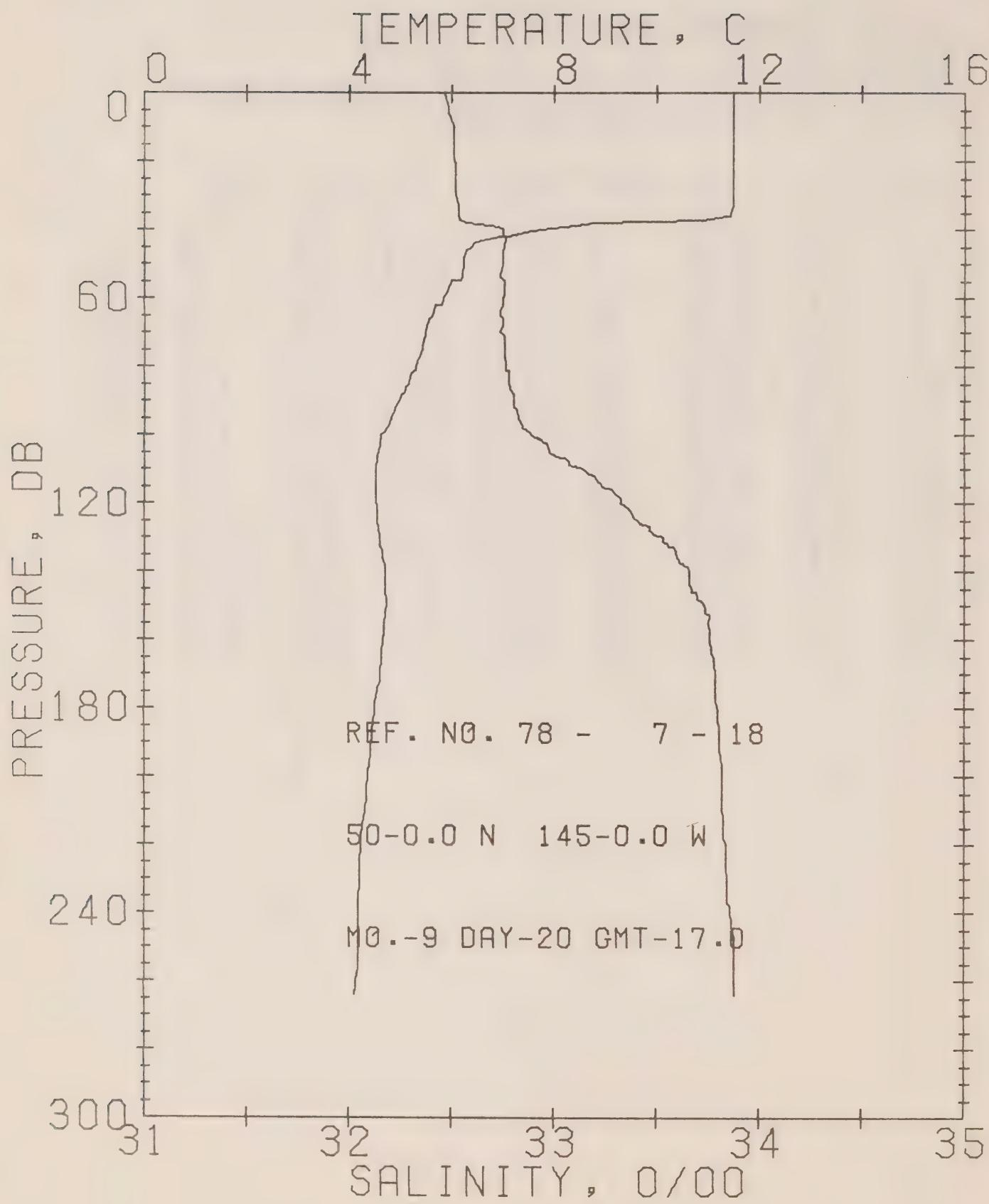
REFERENCE NO. 78- 7- 16

DATE 19/ 9/78

POSITION 50- .0N, 145- .0W GMT 19.7

RESULTS OF STP CAST 295 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	DELTA	POT.	SOUND
				T		D	EN	
0	11.88	32.46	0	24.66	328.6	.00	.00	1494.
10	11.87	32.49	10	24.69	326.1	.33	.02	1494.
20	11.87	32.52	20	24.71	324.5	.65	.07	1494.
30	11.87	32.53	30	24.72	324.0	.98	.15	1494.
50	6.25	32.75	50	25.77	224.1	1.55	.38	1474.
75	5.45	32.77	75	25.88	213.9	2.10	.72	1471.
100	4.92	32.81	99	25.97	204.9	2.62	1.19	1469.
125	4.55	33.28	124	26.39	166.0	3.09	1.73	1469.
150	4.59	33.67	149	26.69	137.5	3.47	2.25	1470.
175	4.56	33.79	174	26.79	128.4	3.80	2.80	1470.
200	4.39	33.82	199	26.83	124.6	4.11	3.40	1470.
225	4.24	33.84	223	26.86	121.7	4.42	4.07	1470.
250	4.14	33.88	248	26.90	117.9	4.72	4.79	1470.
300	3.99	33.92	298	26.95	113.6	5.30	6.41	1470.
400	3.87	34.02	397	27.05	105.6	6.39	10.31	1472.
500	3.78	34.12	496	27.13	98.0	7.41	14.97	1473.
600	3.59	34.19	595	27.21	91.6	8.35	20.27	1474.
800	3.21	34.31	793	27.34	80.3	10.06	32.42	1476.
1000	2.87	34.38	990	27.42	72.6	11.58	46.30	1478.
1200	2.61	34.44	1188	27.49	66.6	12.96	61.81	1480.



OFFSHORE OCEANOGRAPHY GROUP

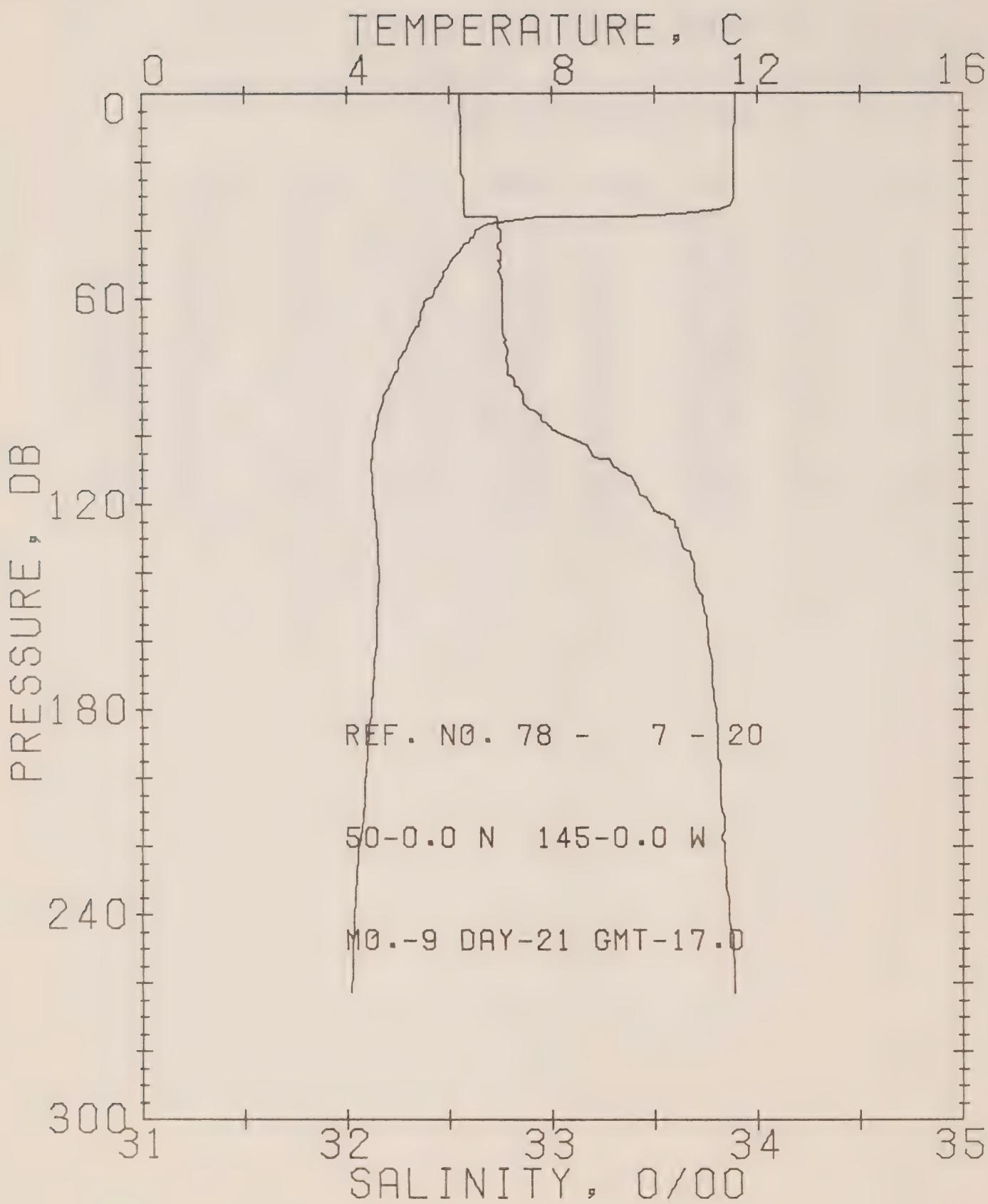
REFERENCE NO. 78- 7- 18 DATE 20/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 180 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.50	32.47	0	24.74	321.3	.00	.00	1493.
10	11.50	32.51	10	24.77	318.5	.32	.02	1493.
20	11.50	32.51	20	24.78	318.4	.64	.06	1493.
30	11.50	32.52	30	24.78	318.2	.96	.15	1493.
50	6.23	32.75	50	25.77	223.8	1.49	.36	1474.
75	5.43	32.76	75	25.88	214.0	2.03	.70	1471.
100	4.64	32.89	99	26.07	196.0	2.55	1.17	1468.
125	4.57	33.40	124	26.48	156.9	2.99	1.66	1469.
150	4.74	33.73	149	26.72	134.6	3.34	2.16	1471.
175	4.55	33.79	174	26.79	128.3	3.67	2.71	1470.
200	4.37	33.82	199	26.83	124.4	3.99	3.31	1470.
225	4.21	33.84	223	26.87	121.4	4.29	3.97	1470.
250	4.19	33.88	248	26.90	118.4	4.59	4.70	1470.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 20

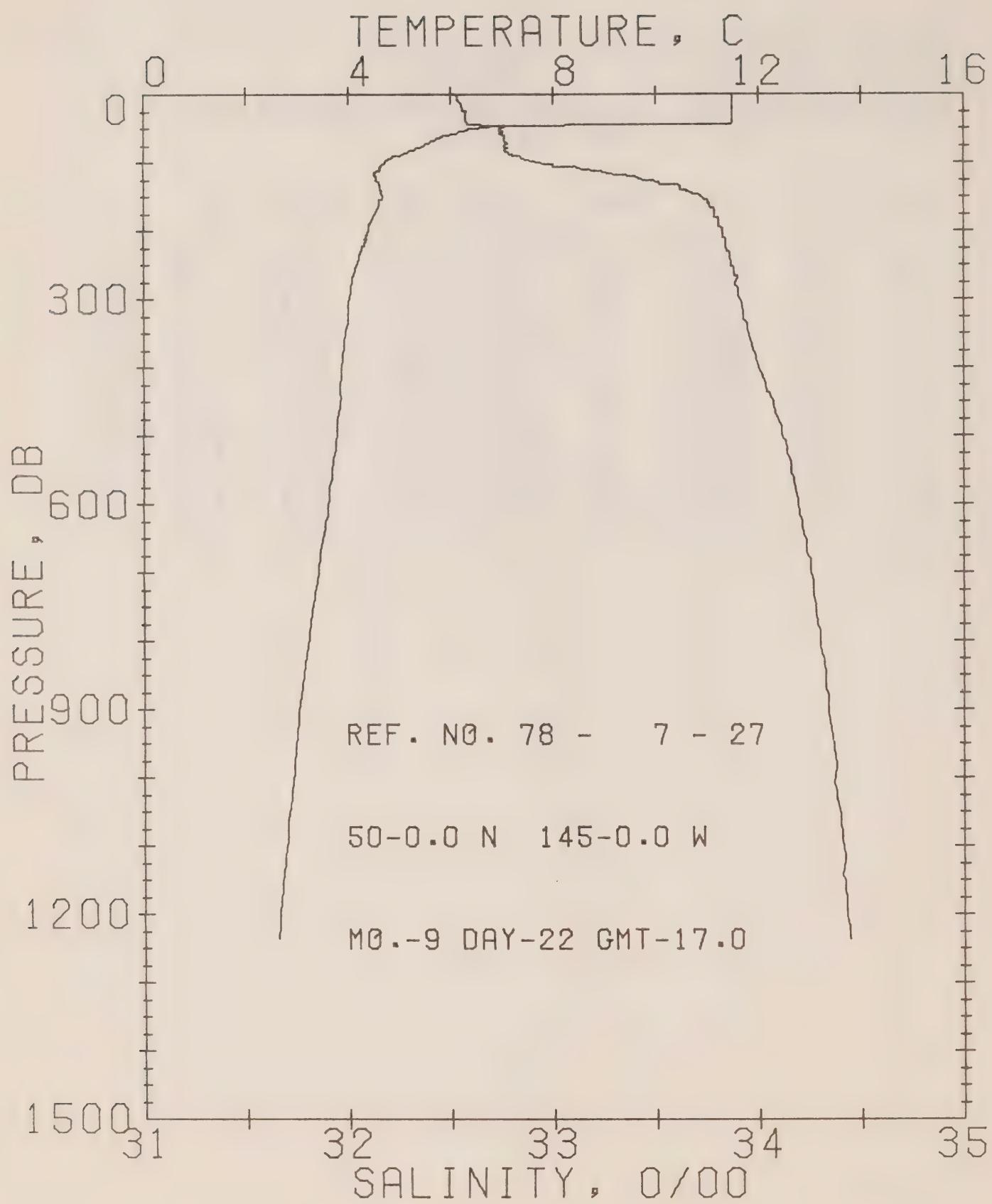
DATE 21/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 183 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.57	32.55	0	24.79	316.6	.00	.00	1493.
10	11.56	32.56	10	24.80	315.9	.32	.02	1493.
20	11.56	32.56	20	24.80	316.1	.63	.06	1493.
30	11.55	32.57	30	24.81	315.4	.95	.14	1493.
50	5.99	32.75	50	25.80	221.0	1.45	.35	1473.
75	5.14	32.79	75	25.93	208.6	1.99	.69	1470.
100	4.56	33.06	99	26.21	182.4	2.49	1.13	1468.
125	4.58	33.60	124	26.64	142.4	2.89	1.59	1469.
150	4.59	33.74	149	26.74	132.5	3.23	2.07	1470.
175	4.51	33.79	174	26.79	127.9	3.56	2.61	1470.
200	4.36	33.82	199	26.83	124.2	3.87	3.21	1470.
225	4.21	33.84	223	26.87	121.1	4.18	3.87	1470.
250	4.10	33.88	248	26.91	117.5	4.47	4.59	1470.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 27

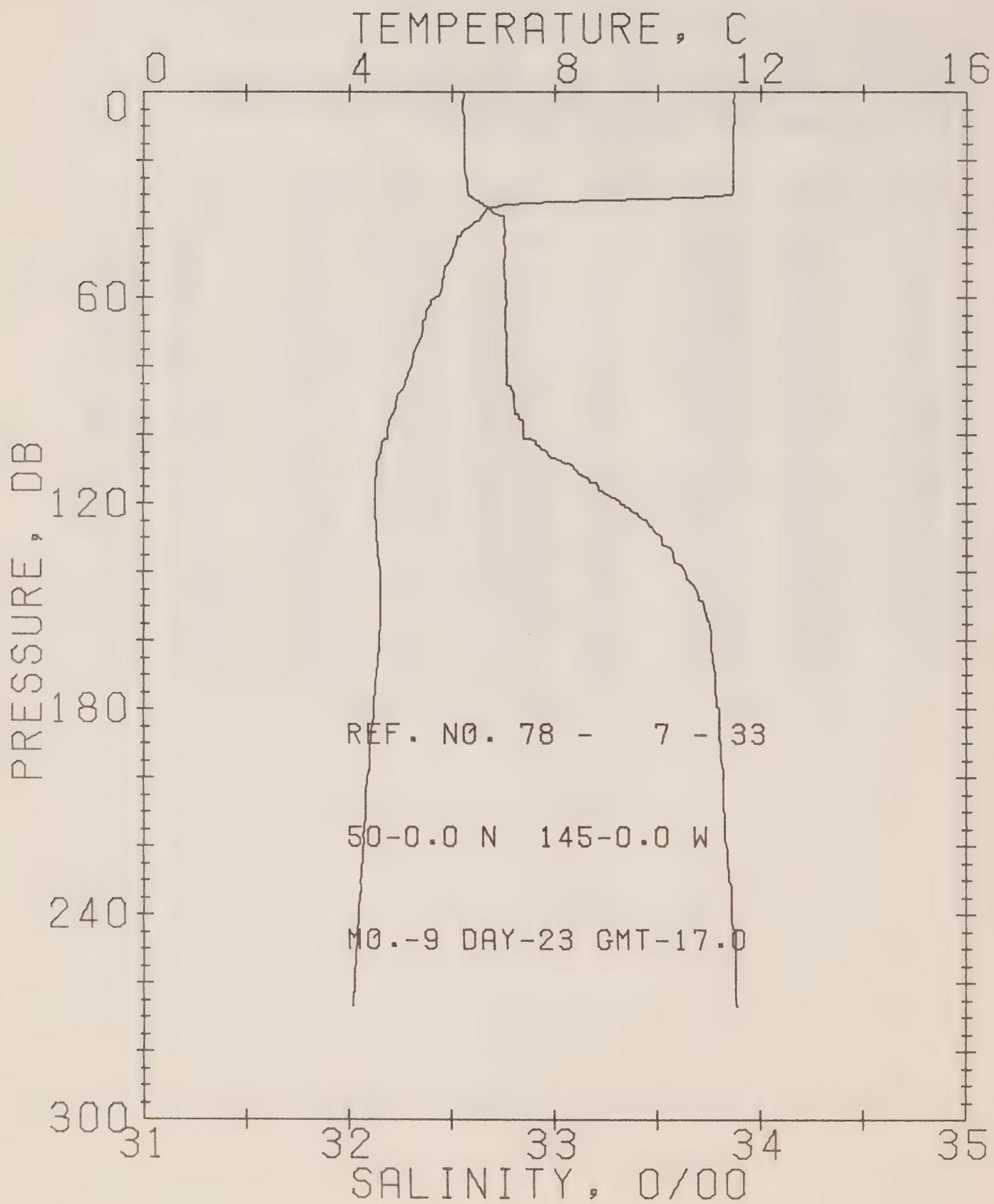
DATE 22/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 331 POINTS TAKEN FROM ANALOG TRACE

GUIDLNE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.49	32.52	0	24.78	317.4	.00	.00	1493.
10	11.50	32.54	10	24.80	316.3	.32	.02	1493.
20	11.48	32.56	20	24.81	314.7	.63	.06	1493.
30	11.49	32.57	30	24.82	314.4	.95	.14	1493.
50	6.52	32.74	50	25.73	228.1	1.53	.38	1475.
75	5.47	32.77	75	25.88	213.7	2.08	.73	1471.
100	4.70	32.94	99	26.10	192.9	2.60	1.19	1469.
125	4.55	33.43	124	26.50	155.1	3.03	1.68	1469.
150	4.69	33.72	149	26.72	134.8	3.38	2.18	1470.
175	4.52	33.79	174	26.79	128.0	3.71	2.72	1470.
200	4.39	33.83	199	26.84	123.8	4.03	3.32	1470.
225	4.27	33.84	223	26.86	122.0	4.33	3.99	1470.
250	4.17	33.87	248	26.89	119.0	4.63	4.71	1470.
300	4.02	33.91	298	26.94	114.9	5.22	6.35	1470.
400	3.88	34.00	397	27.03	107.5	6.33	10.30	1472.
500	3.78	34.11	496	27.12	99.0	7.35	15.01	1473.
600	3.61	34.19	595	27.20	92.0	8.30	20.32	1474.
800	3.22	34.30	793	27.33	81.0	10.02	32.54	1476.
1000	2.91	34.37	990	27.42	73.6	11.55	46.55	1478.
1200	2.65	34.43	1188	27.48	67.7	12.95	62.26	1480.



OFFSHORE OCEANOGRAPHY GROUP

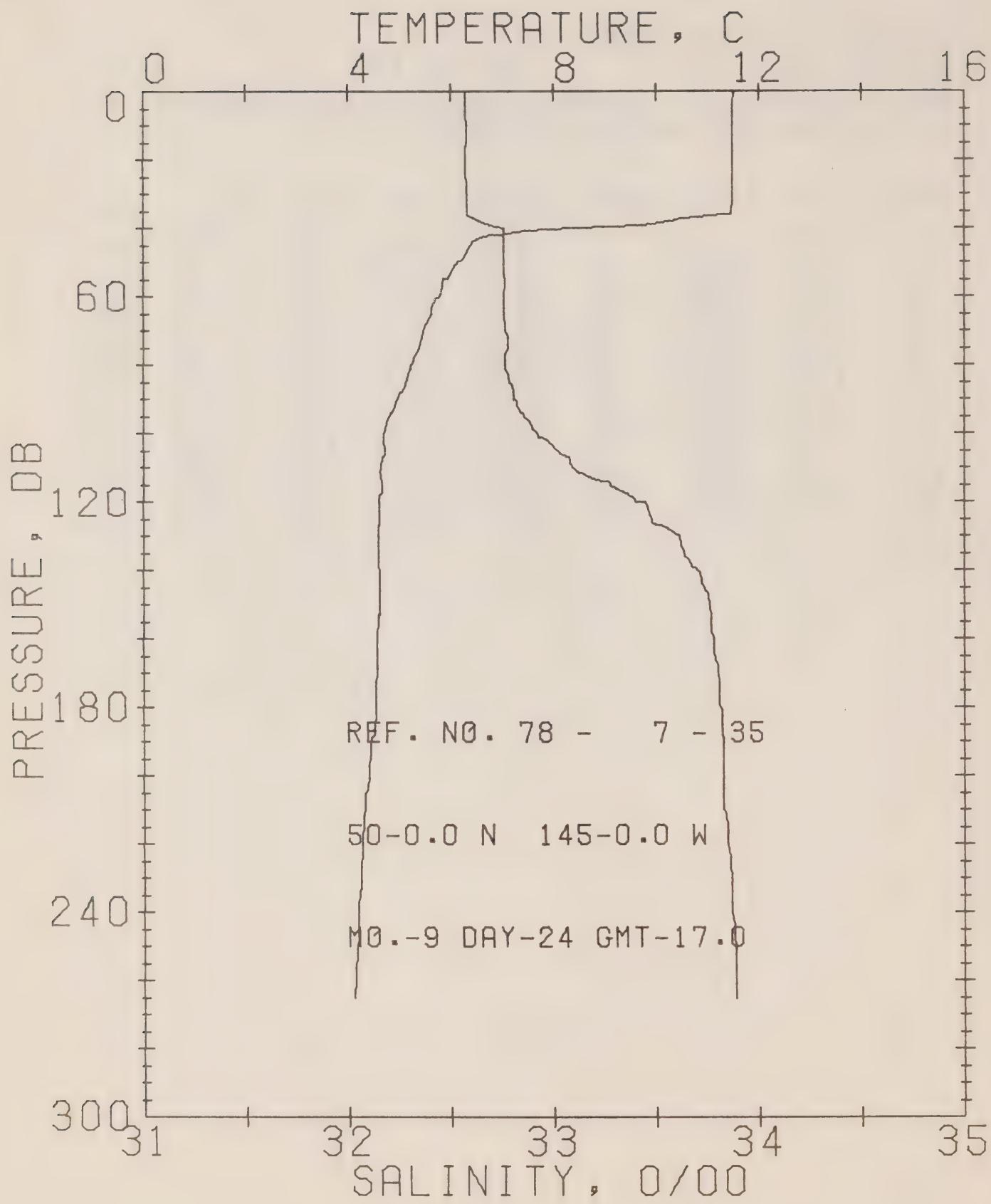
REFERENCE NO. 78- 7- 33

DATE 23/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 181 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	DELTA	POT.	SOUND
				T		D	EN	
0	11.47	32.56	0	24.82	314.1	.00	.00	1493.
10	11.47	32.56	10	24.82	314.3	.31	.02	1493.
20	11.46	32.56	20	24.82	314.4	.63	.06	1493.
30	11.45	32.58	30	24.84	312.9	.94	.14	1493.
50	5.91	32.75	50	25.81	220.0	1.41	.33	1473.
75	5.29	32.77	75	25.90	211.7	1.95	.68	1470.
100	4.75	32.85	99	26.02	200.2	2.46	1.14	1469.
125	4.53	33.45	124	26.52	153.1	2.91	1.64	1469.
150	4.61	33.72	149	26.73	133.7	3.26	2.14	1470.
175	4.50	33.78	174	26.79	128.2	3.59	2.68	1470.
200	4.35	33.82	199	26.83	124.1	3.90	3.28	1470.
225	4.25	33.84	223	26.86	121.9	4.21	3.95	1470.
250	4.14	33.88	248	26.90	117.9	4.51	4.67	1470.



## OFFSHORE OCEANOGRAPHY GROUP

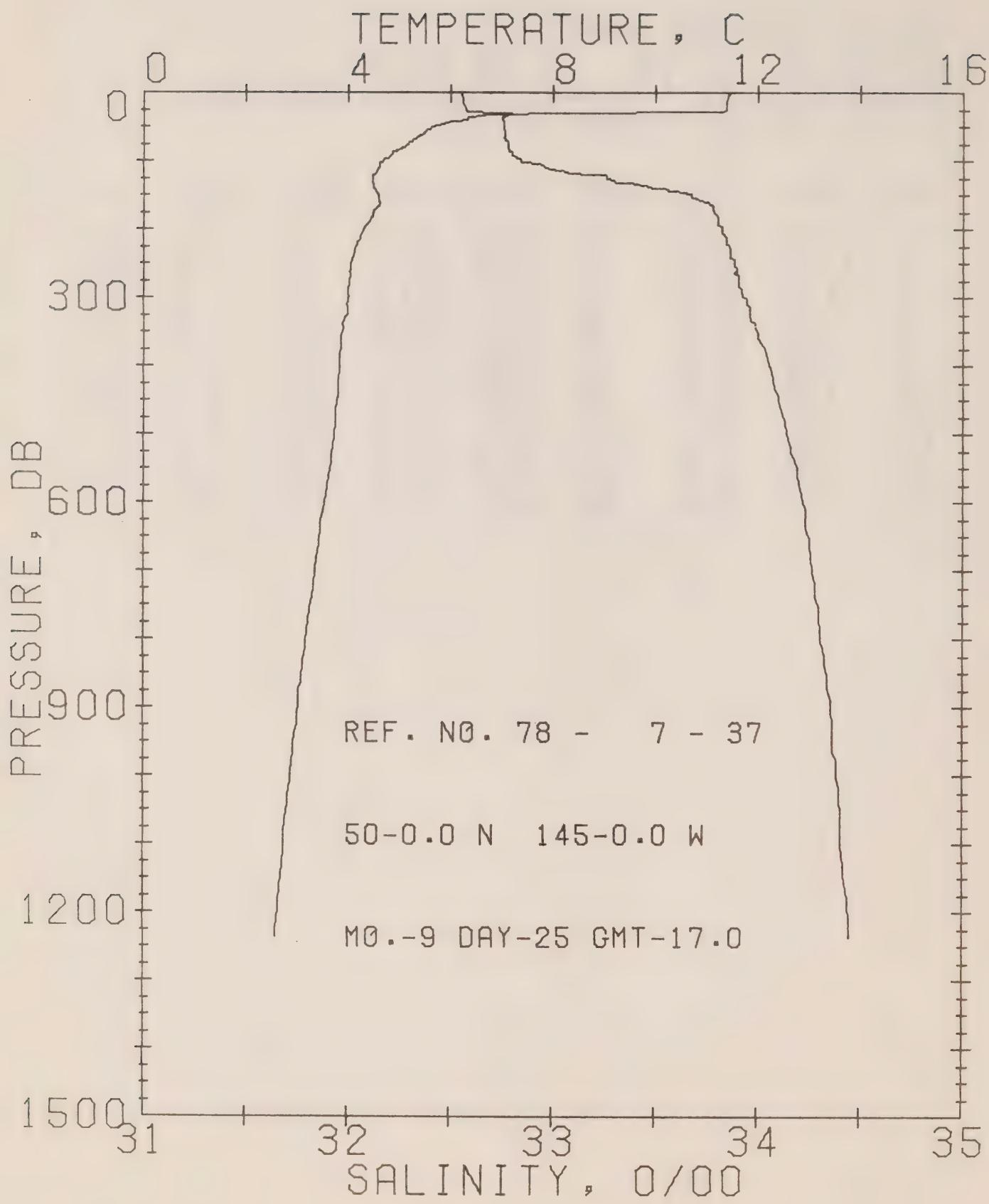
REFERENCE NO. 78- 7- 35 DATE 24/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 179 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.50	32.57	0	24.82	313.9	.00	.00	1493.
10	11.49	32.58	10	24.83	313.2	.31	.02	1493.
20	11.49	32.57	20	24.82	314.2	.63	.06	1493.
30	11.48	32.58	30	24.83	313.5	.94	.14	1493.
50	6.14	32.76	50	25.79	222.0	1.47	.36	1473.
75	5.38	32.78	75	25.90	212.0	2.01	.70	1471.
100	4.69	32.92	99	26.09	194.3	2.53	1.16	1469.
125	4.60	33.48	124	26.54	151.6	2.96	1.65	1469.
150	4.61	33.76	149	26.76	130.9	3.30	2.13	1470.
175	4.54	33.81	174	26.81	126.6	3.63	2.67	1470.
200	4.39	33.83	199	26.84	123.9	3.94	3.27	1470.
225	4.25	33.86	223	26.88	120.3	4.25	3.93	1470.
250	4.17	33.89	248	26.91	117.7	4.54	4.65	1470.



OFFSHORE OCEANOGRAPHY GROUP

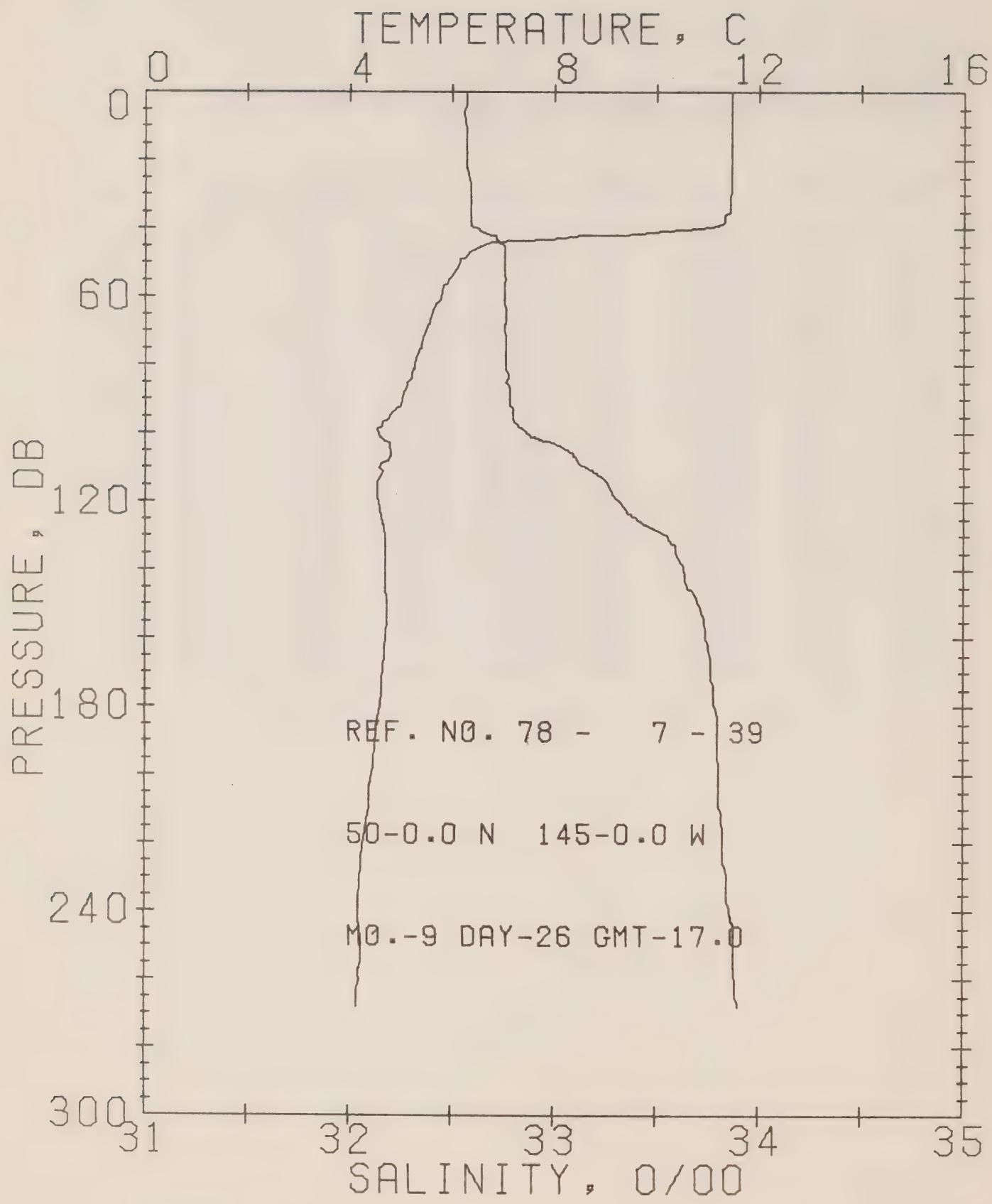
REFERENCE NO. 78- 7- 37 DATE 25/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 271 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.46	32.55	0	24.81	314.7	.00	.00	1492.
10	11.41	32.56	10	24.83	313.2	.31	.02	1492.
20	11.40	32.56	20	24.83	313.0	.63	.06	1493.
30	9.28	32.69	30	25.29	269.6	.94	.14	1485.
50	5.66	32.76	50	25.85	216.4	1.38	.32	1472.
75	5.17	32.78	75	25.92	209.7	1.92	.66	1470.
100	4.68	32.85	99	26.03	199.6	2.43	1.12	1468.
125	4.48	33.26	124	26.38	166.8	2.89	1.65	1469.
150	4.61	33.67	149	26.69	137.6	3.27	2.18	1470.
175	4.50	33.79	174	26.80	127.8	3.60	2.73	1470.
200	4.31	33.83	199	26.85	122.9	3.92	3.32	1470.
225	4.15	33.86	223	26.89	119.1	4.22	3.98	1470.
250	4.06	33.89	248	26.92	116.3	4.51	4.69	1470.
300	4.01	33.94	298	26.96	112.5	5.09	6.30	1470.
400	3.83	34.05	397	27.07	103.0	6.16	10.13	1471.
500	3.73	34.14	496	27.15	96.2	7.16	14.69	1473.
600	3.54	34.22	595	27.23	89.1	8.08	19.87	1474.
800	3.18	34.31	793	27.34	79.9	9.77	31.86	1476.
1000	2.88	34.39	990	27.43	72.0	11.28	45.69	1478.
1200	2.63	34.44	1188	27.50	66.4	12.67	61.21	1480.



OFFSHORE OCEANOGRAPHY GROUP

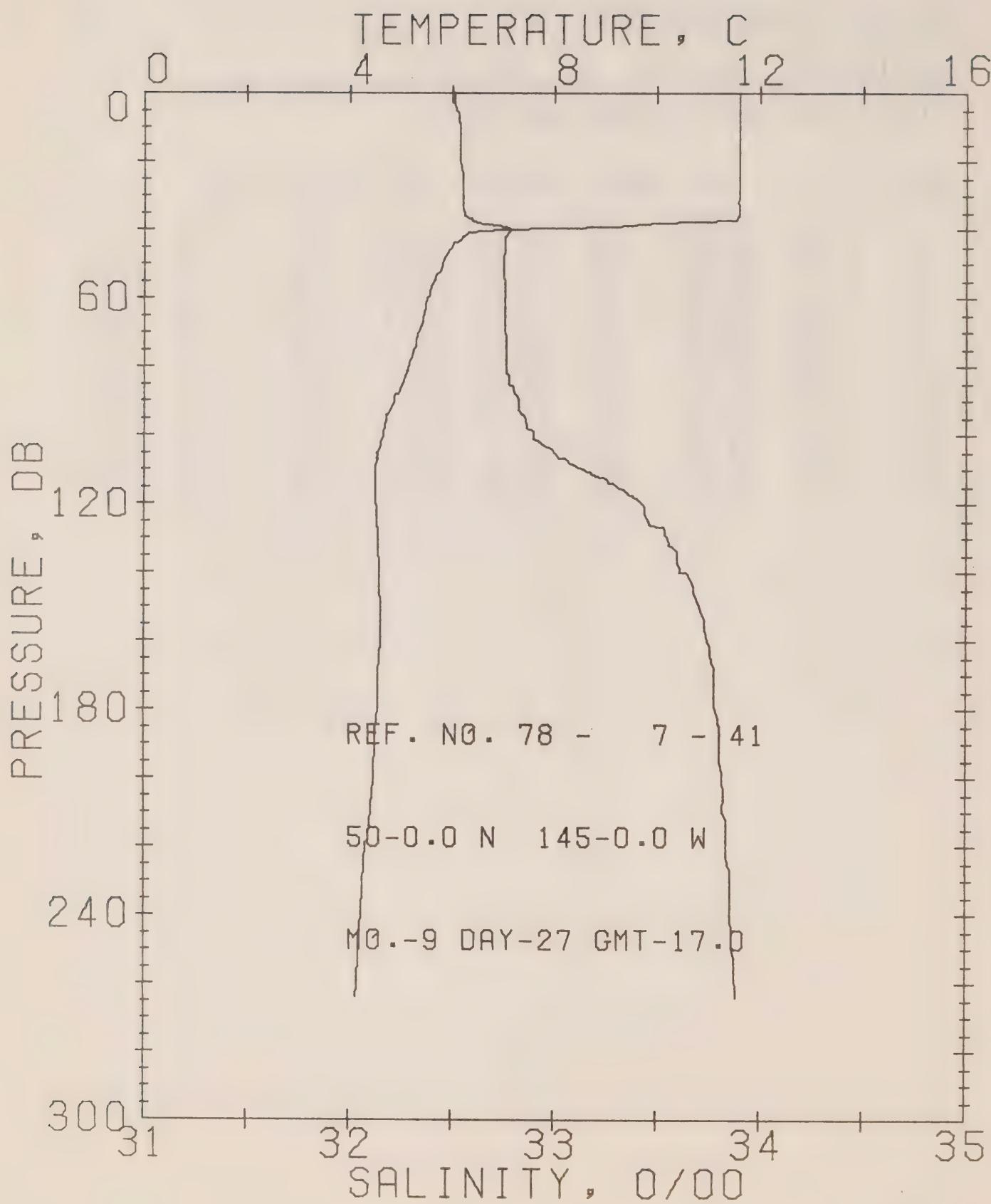
REFERENCE NO. 78- 7- 39 DATE 26/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 192 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.46	32.57	0	24.83	313.2	.00	.00	1493.
10	11.46	32.57	10	24.82	313.6	.31	.02	1493.
20	11.46	32.57	20	24.83	313.6	.63	.06	1493.
30	11.46	32.59	30	24.84	312.3	.94	.14	1493.
50	6.15	32.76	50	25.79	222.1	1.49	.36	1474.
75	5.41	32.77	75	25.89	213.1	2.03	.71	1471.
100	4.58	32.87	99	26.06	196.9	2.55	1.17	1468.
125	4.65	33.41	124	26.48	157.3	2.99	1.67	1469.
150	4.74	33.70	149	26.70	136.6	3.35	2.17	1471.
175	4.63	33.78	174	26.77	129.9	3.68	2.72	1471.
200	4.45	33.81	199	26.82	125.9	4.00	3.33	1470.
225	4.25	33.83	223	26.85	122.5	4.31	4.01	1470.
250	4.23	33.88	248	26.90	118.8	4.61	4.73	1470.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 41

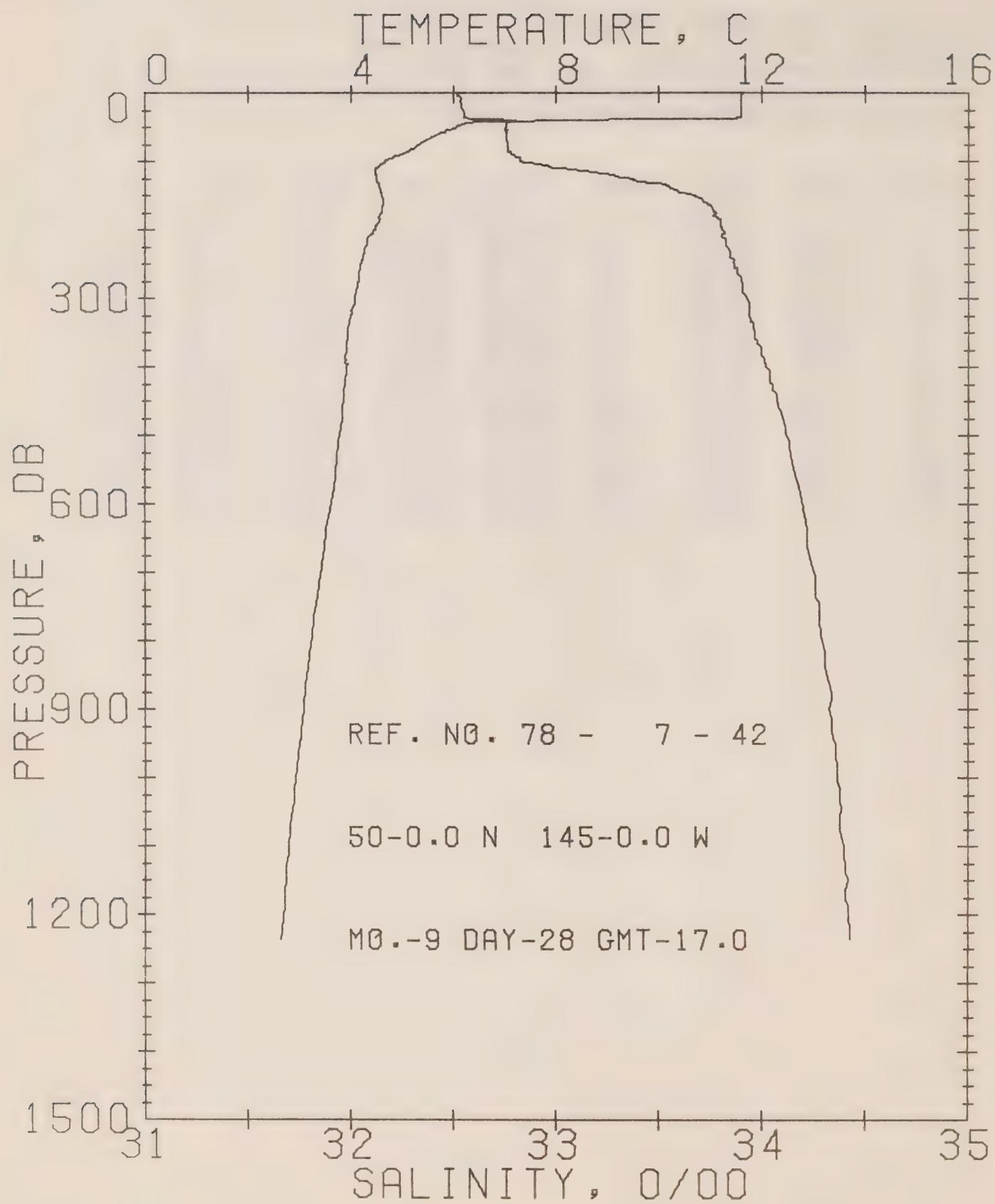
DATE 27/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 194 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	DELTA	POT.	SOUND
				T	D	EN		
0	11.61	32.51	0	24.75	320.2	.00	.00	1493.
10	11.59	32.54	10	24.78	317.9	.32	.02	1493.
20	11.59	32.54	20	24.78	318.1	.64	.06	1493.
30	11.59	32.55	30	24.79	317.6	.95	.15	1493.
50	5.81	32.75	50	25.82	218.9	1.48	.36	1472.
75	5.26	32.77	75	25.90	211.4	2.02	.70	1470.
100	4.67	32.90	99	26.07	195.6	2.53	1.15	1468.
125	4.54	33.46	124	26.53	152.4	2.96	1.64	1469.
150	4.60	33.70	149	26.72	134.9	3.31	2.14	1470.
175	4.57	33.78	174	26.78	129.2	3.64	2.68	1470.
200	4.48	33.82	199	26.82	125.4	3.96	3.29	1471.
225	4.29	33.85	223	26.87	121.5	4.27	3.96	1470.
250	4.19	33.87	248	26.89	119.2	4.57	4.68	1470.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 42

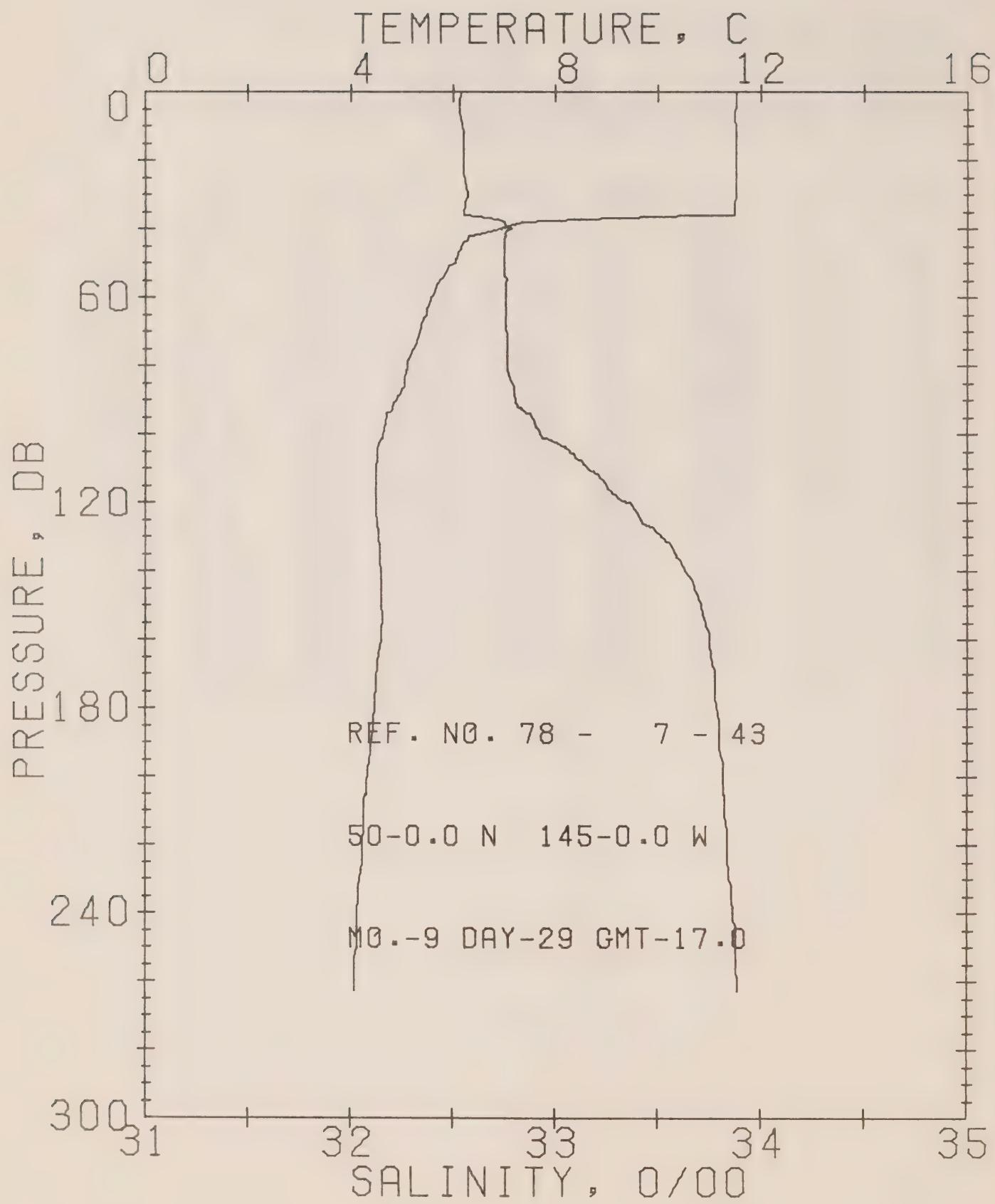
DATE 28/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 289 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.61	32.53	0	24.77	318.8	.00	.00	1493.
10	11.59	32.54	10	24.78	318.1	.32	.02	1493.
20	11.59	32.54	20	24.78	318.1	.64	.06	1493.
30	11.59	32.55	30	24.79	317.6	.95	.15	1493.
50	6.06	32.76	50	25.80	221.0	1.48	.36	1473.
75	5.34	32.77	75	25.90	212.3	2.02	.70	1471.
100	4.68	32.84	99	26.02	200.5	2.54	1.16	1468.
125	4.51	33.37	124	26.46	158.9	2.99	1.68	1469.
150	4.61	33.68	149	26.70	136.9	3.36	2.19	1470.
175	4.60	33.78	174	26.78	129.6	3.69	2.74	1471.
200	4.48	33.81	199	26.81	126.3	4.01	3.35	1471.
225	4.29	33.83	223	26.85	122.8	4.32	4.03	1470.
250	4.20	33.87	248	26.89	119.3	4.63	4.76	1470.
300	4.08	33.93	298	26.95	114.2	5.21	6.39	1471.
400	3.93	34.02	397	27.04	106.5	6.31	10.32	1472.
500	3.79	34.11	496	27.13	98.8	7.33	15.00	1473.
600	3.61	34.20	595	27.21	91.6	8.28	20.33	1474.
800	3.23	34.30	793	27.33	81.5	10.01	32.62	1476.
1000	2.94	34.37	990	27.41	74.1	11.56	46.81	1478.
1200	2.70	34.42	1188	27.47	68.9	12.99	62.78	1480.



## OFFSHORE OCEANOGRAPHY GROUP

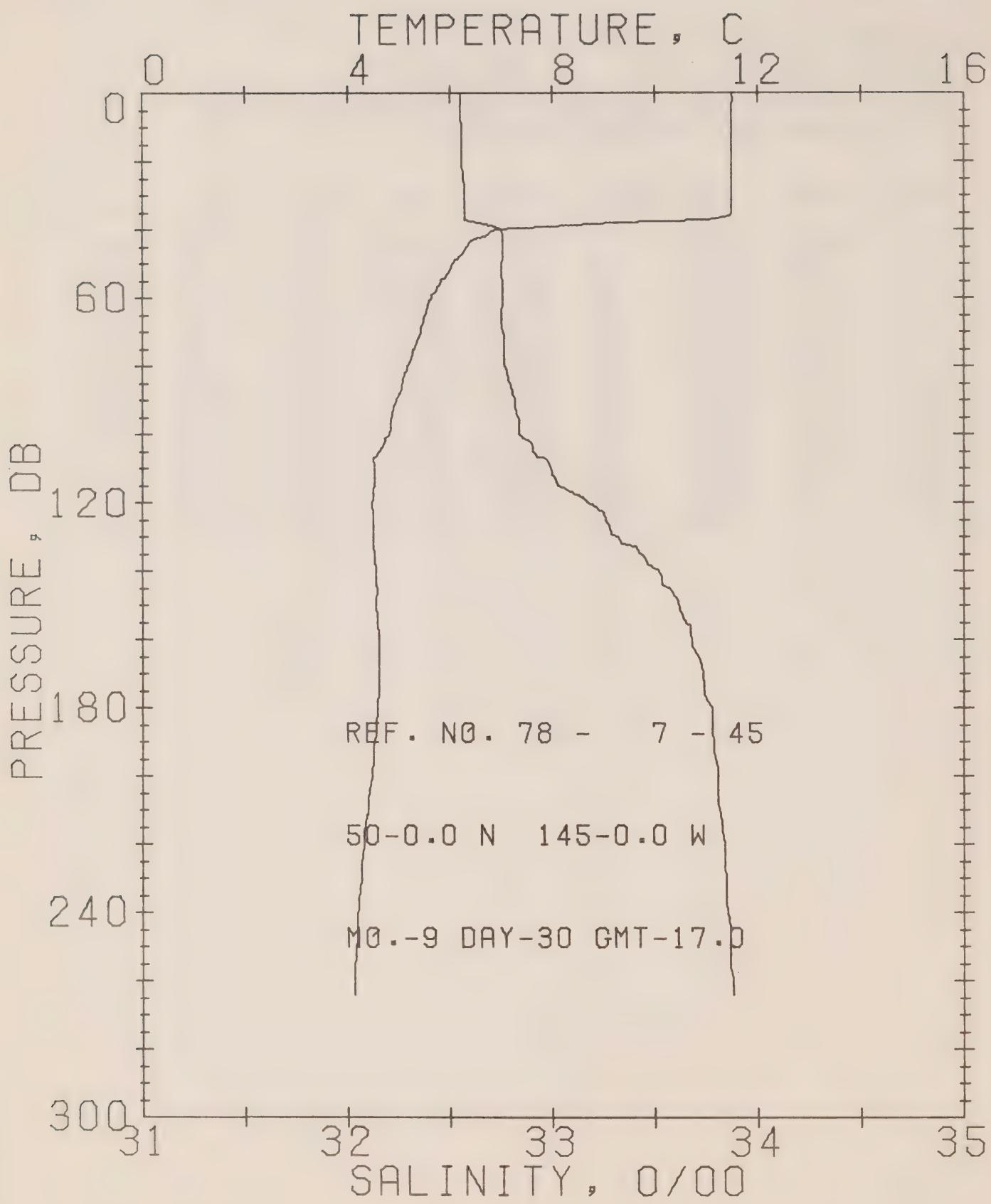
REFERENCE NO. 78- 7- 43 DATE 29/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 168 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.52	32.54	0	24.79	316.5	.00	.00	1493.
10	11.51	32.54	10	24.80	316.2	.32	.02	1493.
20	11.51	32.55	20	24.80	316.0	.63	.06	1493.
30	11.51	32.57	30	24.82	314.7	.95	.14	1493.
50	6.05	32.75	50	25.79	221.7	1.46	.35	1473.
75	5.22	32.77	75	25.91	211.0	2.00	.69	1470.
100	4.64	32.93	99	26.10	193.0	2.51	1.15	1468.
125	4.53	33.42	124	26.50	155.3	2.94	1.64	1469.
150	4.61	33.71	149	26.72	134.7	3.30	2.14	1470.
175	4.51	33.78	174	26.79	128.6	3.62	2.68	1470.
200	4.33	33.82	199	26.84	124.0	3.94	3.28	1470.
225	4.23	33.84	223	26.86	121.6	4.25	3.94	1470.
250	4.13	33.88	248	26.91	117.8	4.54	4.66	1470.



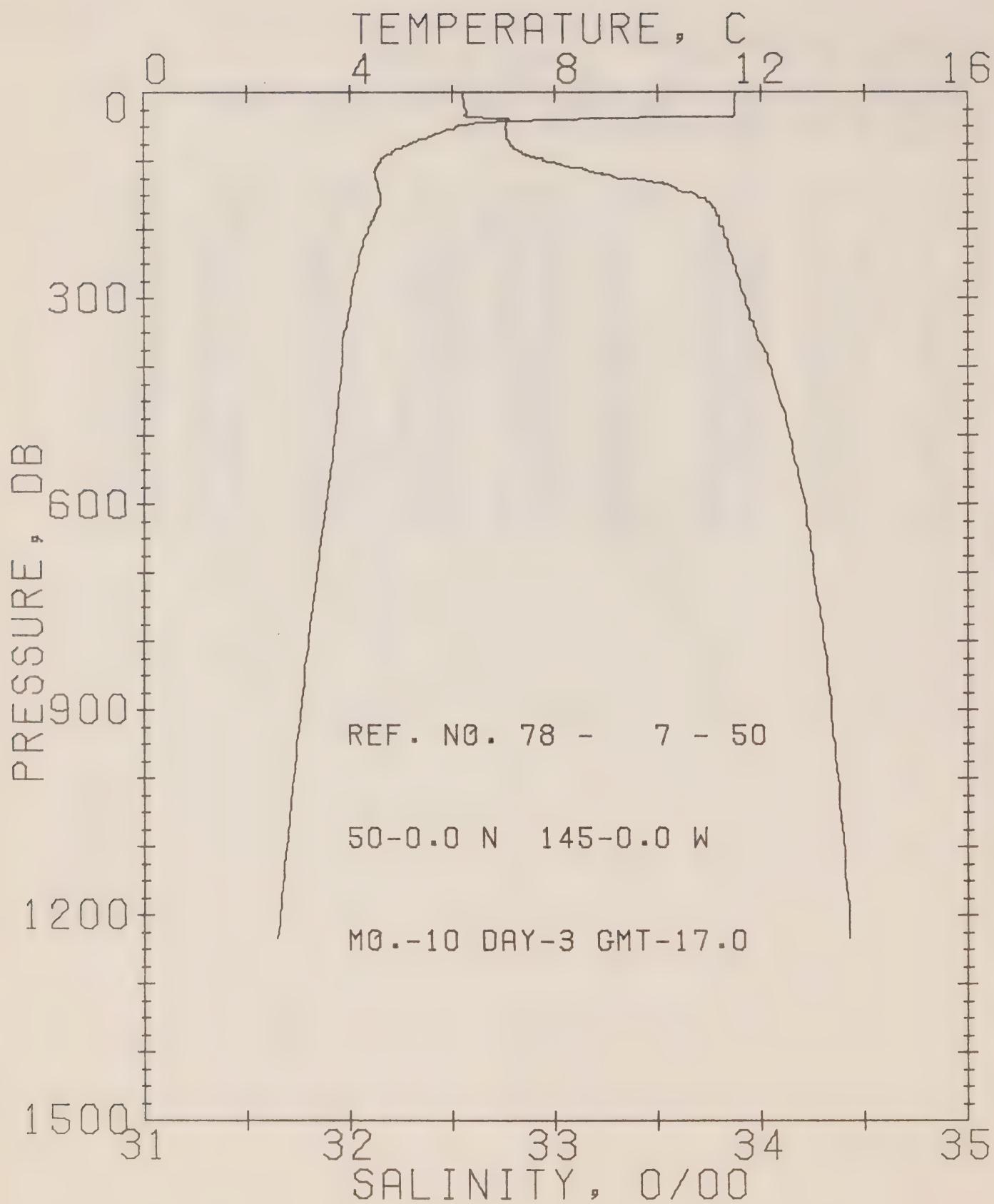
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 45 DATE 30/ 9/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 161 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.50	32.55	0	24.80	315.4	.00	.00	1493.
10	11.49	32.56	10	24.81	314.7	.32	.02	1493.
20	11.49	32.56	20	24.81	314.9	.63	.06	1493.
30	11.49	32.57	30	24.82	314.4	.94	.14	1493.
50	6.06	32.75	50	25.79	221.8	1.47	.35	1473.
75	5.32	32.77	75	25.90	212.1	2.01	.70	1471.
100	4.83	32.84	99	26.01	201.7	2.53	1.16	1469.
125	4.50	33.26	124	26.38	167.0	2.99	1.68	1469.
150	4.57	33.61	149	26.65	141.4	3.37	2.22	1470.
175	4.61	33.74	174	26.74	132.6	3.71	2.78	1471.
200	4.48	33.81	199	26.81	126.3	4.03	3.40	1471.
225	4.28	33.84	223	26.86	122.1	4.34	4.07	1470.
250	4.17	33.87	248	26.89	119.0	4.64	4.80	1470.



OFFSHORE OCEANOGRAPHY GROUP

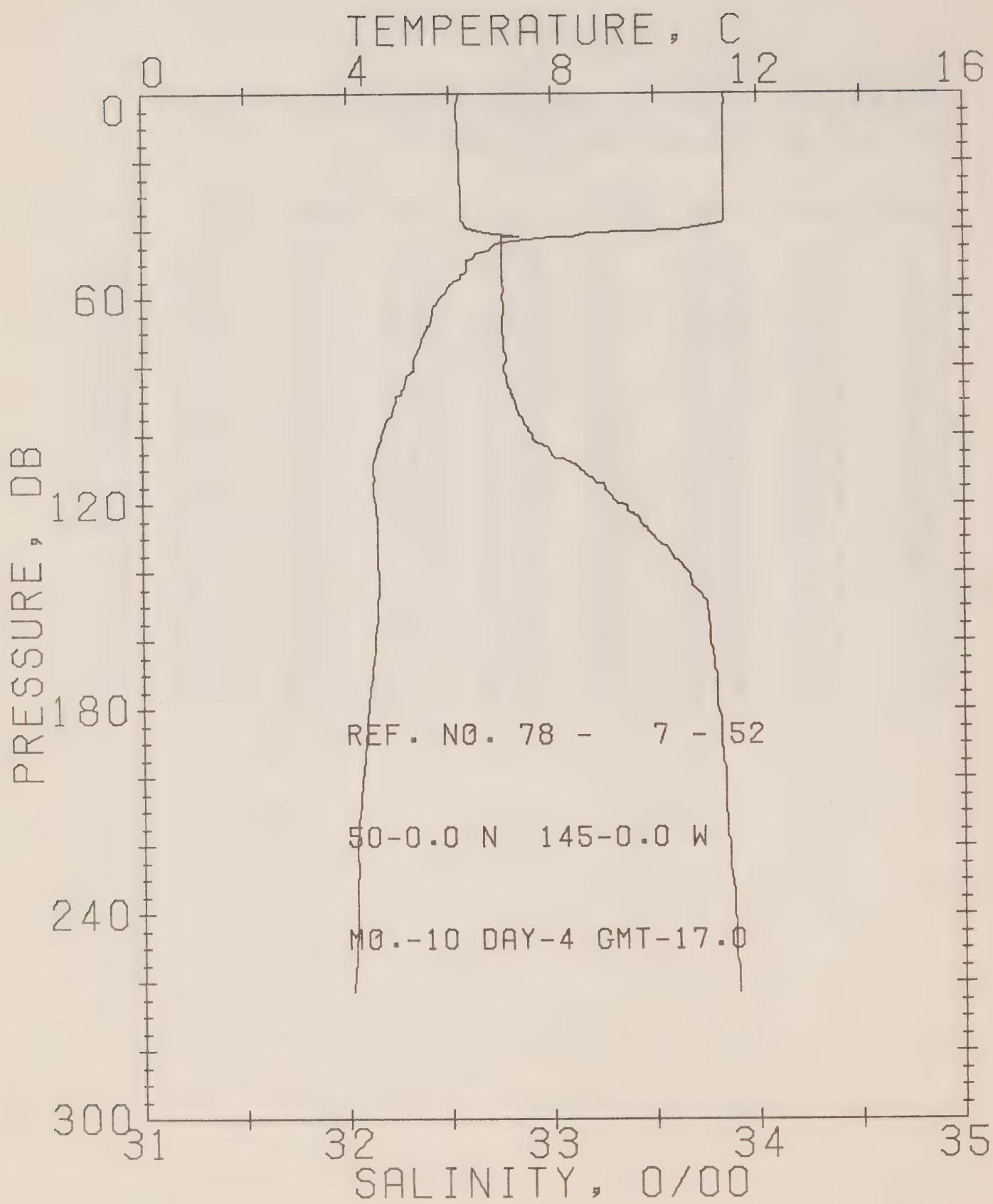
REFERENCE NO. 78- 7- 50 DATE 3/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 245 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.50	32.55	0	24.80	315.4	.00	.00	1493.
10	11.50	32.55	10	24.81	315.2	.32	.02	1493.
20	11.50	32.56	20	24.81	315.1	.63	.06	1493.
30	11.50	32.57	30	24.82	314.5	.95	.14	1493.
50	6.12	32.77	50	25.80	221.3	1.47	.35	1473.
75	5.17	32.79	75	25.93	208.9	2.00	.69	1470.
100	4.61	32.96	99	26.13	190.4	2.51	1.14	1468.
125	4.51	33.32	124	26.42	162.6	2.95	1.65	1469.
150	4.61	33.68	149	26.70	136.5	3.31	2.16	1470.
175	4.52	33.79	174	26.79	128.3	3.64	2.70	1470.
200	4.37	33.82	199	26.83	124.3	3.96	3.31	1470.
225	4.24	33.84	223	26.86	121.7	4.27	3.97	1470.
250	4.18	33.87	248	26.89	119.1	4.57	4.70	1470.
300	4.02	33.93	298	26.95	113.5	5.15	6.33	1470.
400	3.86	34.04	397	27.06	104.0	6.24	10.20	1471.
500	3.73	34.14	496	27.15	96.4	7.24	14.78	1473.
600	3.55	34.22	595	27.23	89.4	8.17	19.99	1474.
800	3.20	34.30	793	27.33	80.7	9.87	32.10	1476.
1000	2.91	34.38	990	27.42	73.4	11.40	46.18	1478.
1200	2.64	34.43	1188	27.48	67.6	12.81	61.97	1480.



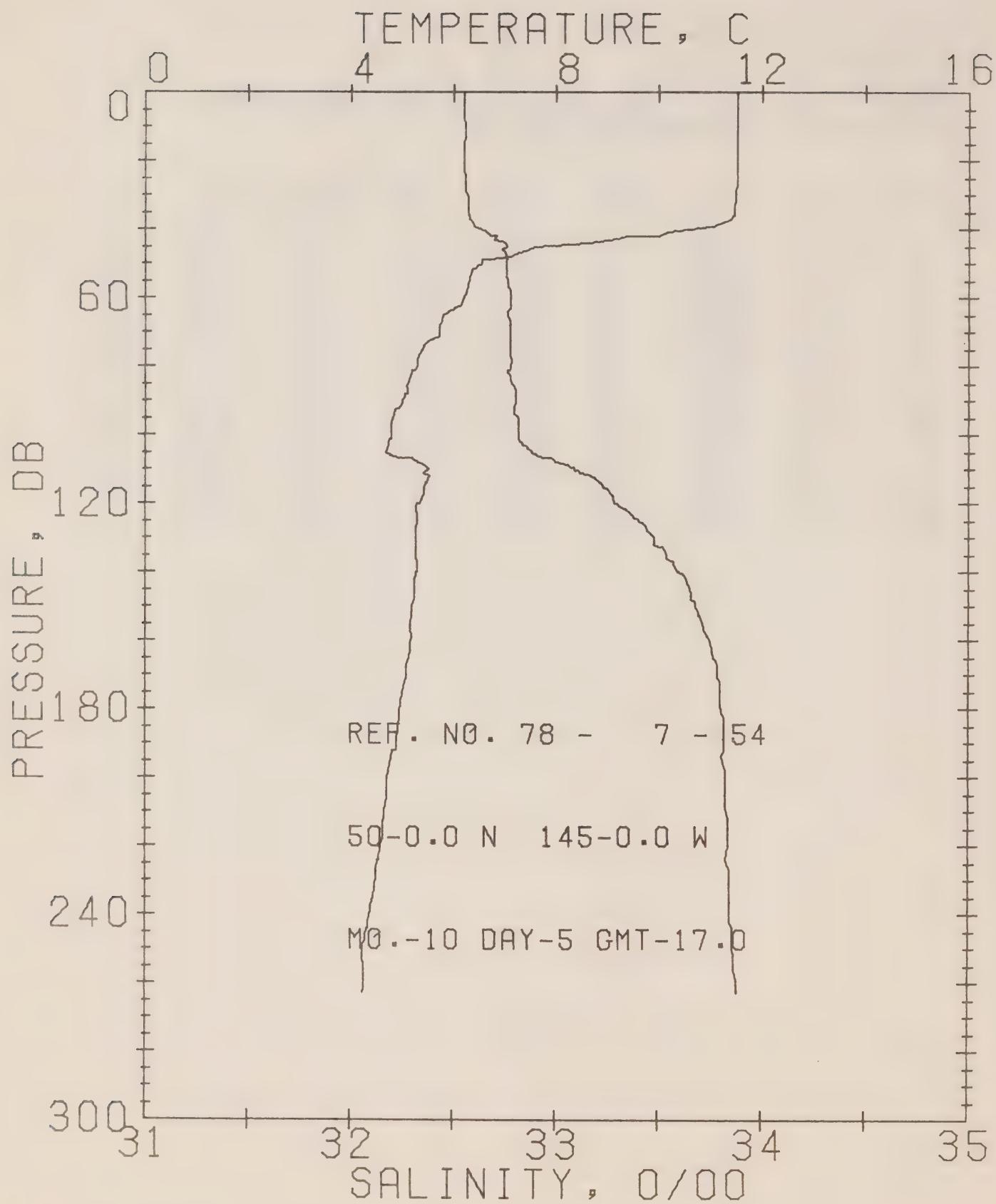
OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 52 DATE 4/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 158 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.37	32.55	0	24.83	313.1	.00	.00	1492.
10	11.36	32.54	10	24.82	313.6	.31	.02	1492.
20	11.36	32.55	20	24.83	313.4	.63	.06	1492.
30	11.36	32.56	30	24.83	313.1	.94	.14	1493.
50	6.35	32.76	50	25.76	224.5	1.49	.36	1474.
75	5.38	32.77	75	25.89	212.7	2.03	.71	1471.
100	4.68	32.91	99	26.08	194.9	2.55	1.17	1469.
125	4.59	33.43	124	26.50	155.2	2.98	1.66	1469.
150	4.58	33.75	149	26.75	131.4	3.34	2.16	1470.
175	4.43	33.80	174	26.81	126.3	3.66	2.69	1470.
200	4.28	33.84	199	26.86	122.0	3.97	3.29	1470.
225	4.18	33.86	223	26.88	119.6	4.27	3.94	1470.
250	4.13	33.89	248	26.91	117.1	4.57	4.65	1470.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 54 DATE 5/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

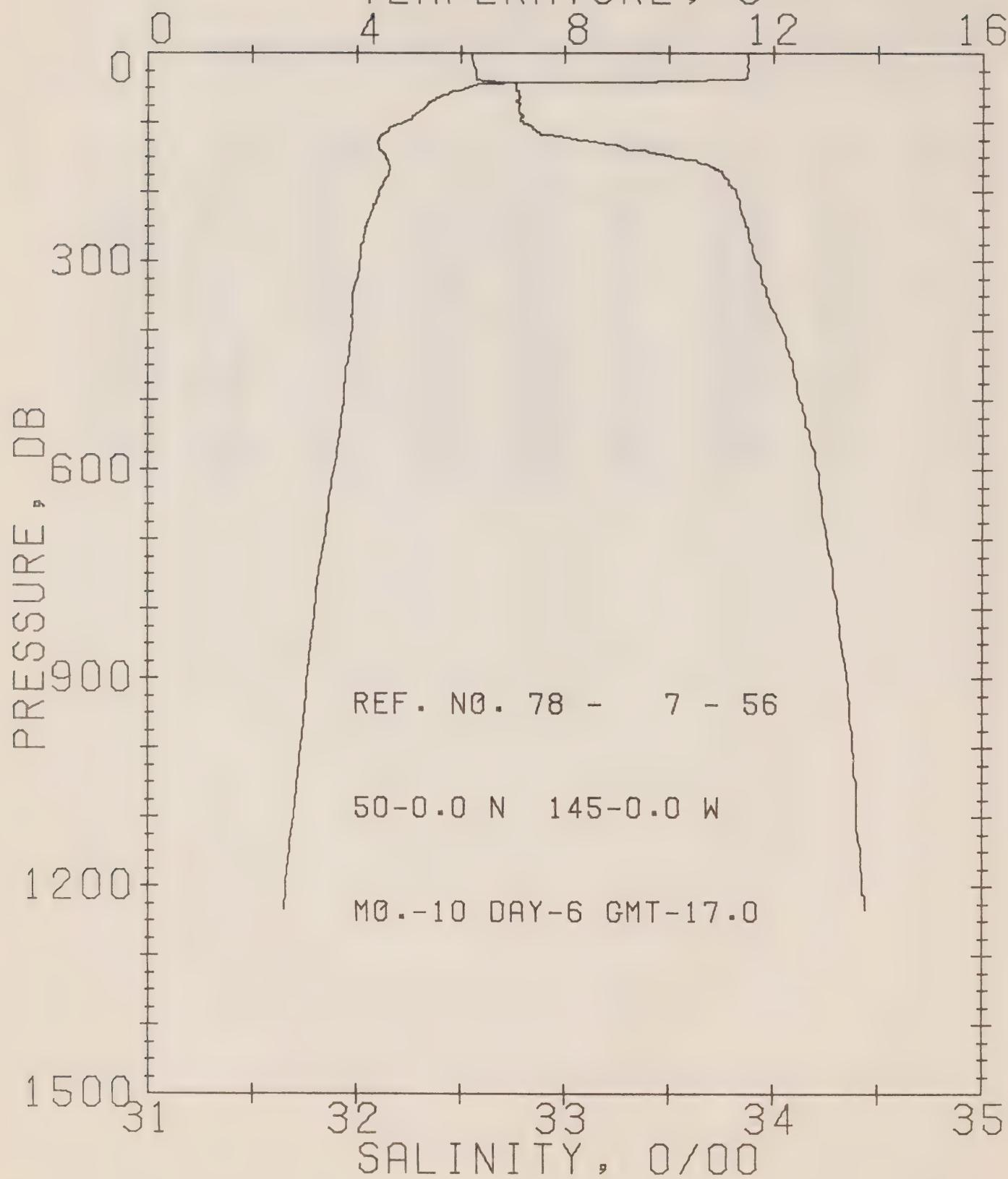
RESULTS OF STP CAST 193 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.52	32.55	0	24.80	315.7	.00	.00	1493.
10	11.52	32.56	10	24.81	315.2	.32	.02	1493.
20	11.51	32.55	20	24.80	316.0	.63	.06	1493.
30	11.49	32.57	30	24.82	314.7	.95	.14	1493.
50	6.56	32.76	50	25.74	227.1	1.51	.37	1475.
75	5.41	32.78	75	25.89	212.3	2.06	.72	1471.
100	4.80	32.82	99	26.00	202.9	2.58	1.18	1469.
125	5.31	33.41	124	26.40	164.6	3.04	1.71	1472.
150	5.20	33.68	149	26.63	143.4	3.42	2.24	1473.
175	5.00	33.80	174	26.75	132.5	3.77	2.81	1472.
200	4.73	33.83	199	26.80	127.5	4.09	3.44	1472.
225	4.53	33.84	223	26.83	125.1	4.41	4.12	1471.
250	4.24	33.86	248	26.88	120.4	4.71	4.86	1470.

100

## TEMPERATURE, C



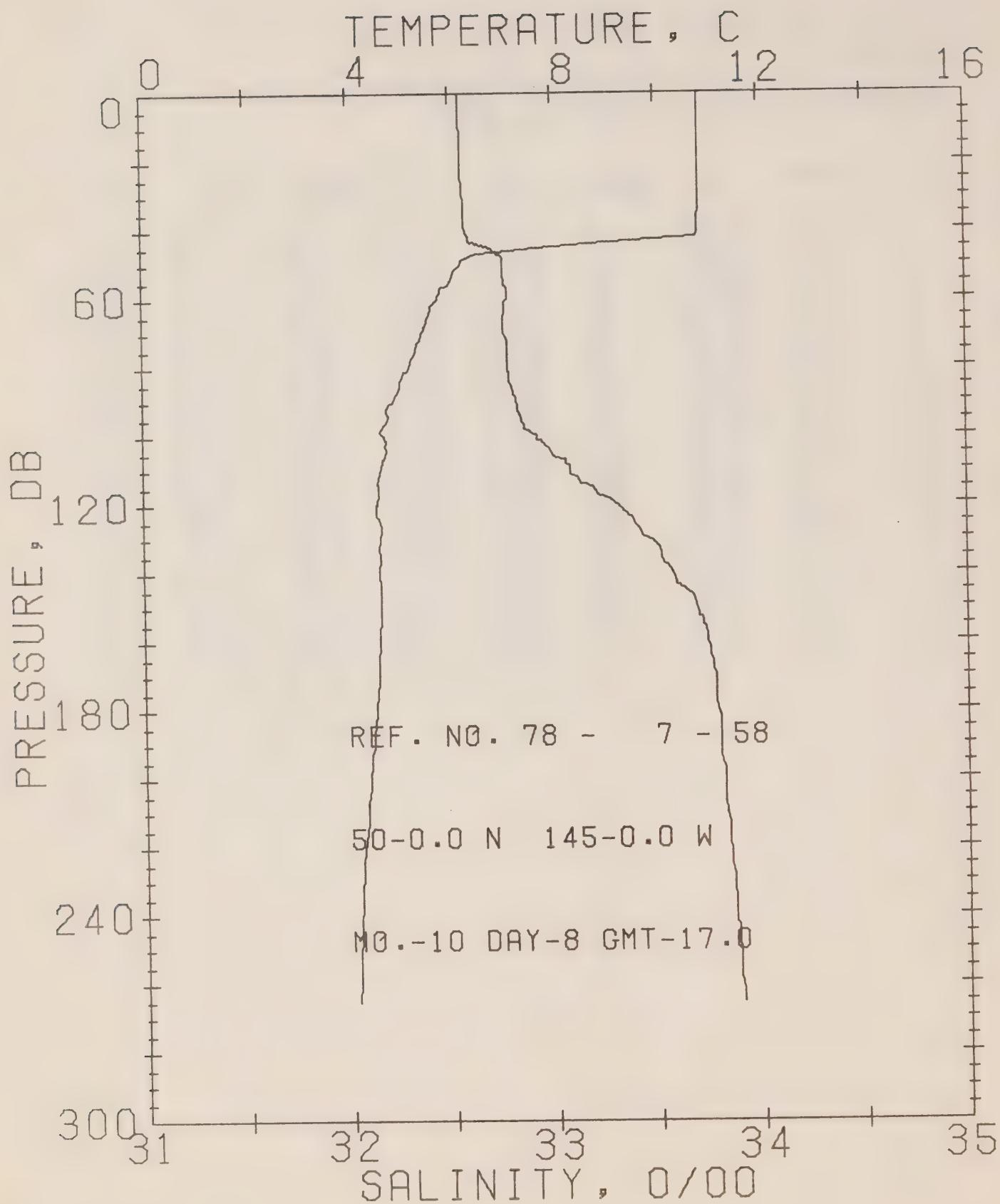
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 56 DATE 6/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 273 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.52	32.55	0	24.80	315.7	.00	.00	1493.
10	11.51	32.56	10	24.81	315.3	.32	.02	1493.
20	11.51	32.56	20	24.81	314.9	.63	.06	1493.
30	11.50	32.57	30	24.82	314.5	.95	.14	1493.
50	6.13	32.77	50	25.80	221.1	1.49	.36	1473.
75	5.35	32.79	75	25.91	211.3	2.03	.70	1471.
100	4.88	32.80	99	25.97	205.3	2.55	1.17	1469.
125	4.43	33.06	124	26.22	181.3	3.04	1.73	1468.
150	4.57	33.51	149	26.57	149.2	3.45	2.30	1470.
175	4.60	33.76	174	26.76	131.1	3.79	2.87	1471.
200	4.43	33.82	199	26.83	124.9	4.11	3.48	1470.
225	4.30	33.84	223	26.86	122.2	4.42	4.15	1470.
250	4.17	33.87	248	26.89	119.0	4.72	4.87	1470.
300	4.05	33.93	298	26.95	114.0	5.30	6.51	1471.
400	3.91	34.04	397	27.06	104.7	6.40	10.41	1472.
500	3.76	34.13	496	27.14	97.6	7.41	15.03	1473.
600	3.57	34.21	595	27.23	90.0	8.34	20.27	1474.
800	3.21	34.31	793	27.34	80.2	10.05	32.39	1476.
1000	2.93	34.38	990	27.42	73.1	11.57	46.36	1478.
1200	2.64	34.43	1188	27.48	67.6	12.98	62.15	1480.



OFFSHORE OCEANOGRAPHY GROUP

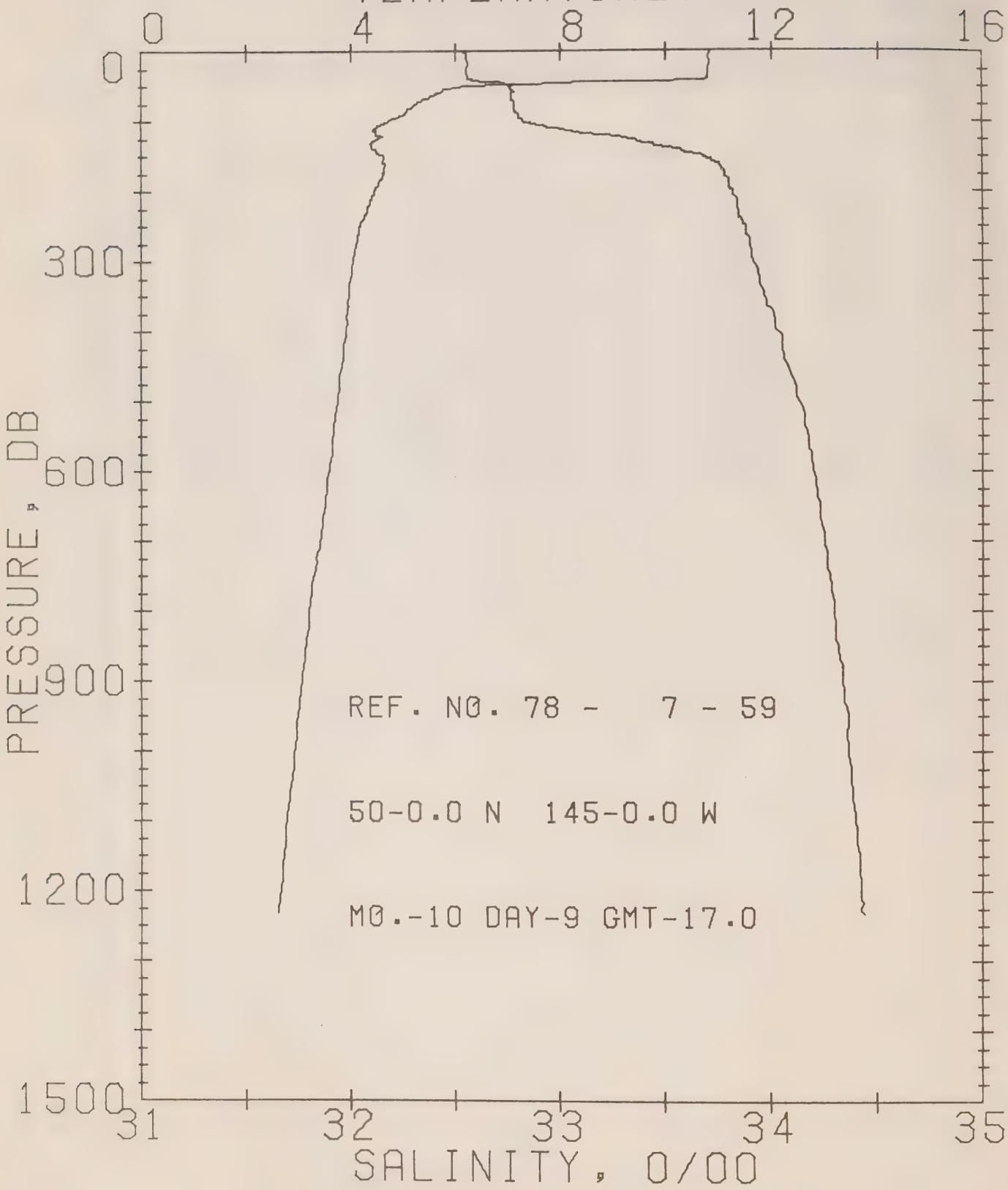
REFERENCE NO. 78- 7- 58 DATE 8/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 172 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	DELTA	POT.	SOUND
				T	D	EN		
0	10.85	32.55	0	24.92	304.3	.00	.00	1490.
10	10.85	32.55	10	24.92	304.2	.30	.02	1490.
20	10.85	32.56	20	24.93	304.0	.61	.06	1491.
30	10.85	32.57	30	24.93	303.7	.91	.14	1491.
50	6.21	32.76	50	25.78	222.8	1.47	.36	1474.
75	5.34	32.78	75	25.90	211.5	2.01	.71	1471.
100	4.69	32.92	99	26.09	194.3	2.53	1.16	1469.
125	4.61	33.39	124	26.47	158.4	2.97	1.67	1469.
150	4.61	33.69	149	26.70	136.2	3.34	2.18	1470.
175	4.53	33.78	174	26.78	128.8	3.66	2.73	1470.
200	4.37	33.82	199	26.83	124.4	3.98	3.33	1470.
225	4.22	33.85	223	26.87	120.8	4.29	4.00	1470.
250	4.15	33.89	248	26.91	117.4	4.59	4.72	1470.

TEMPERATURE, C



## OFFSHORE OCEANOGRAPHY GROUP

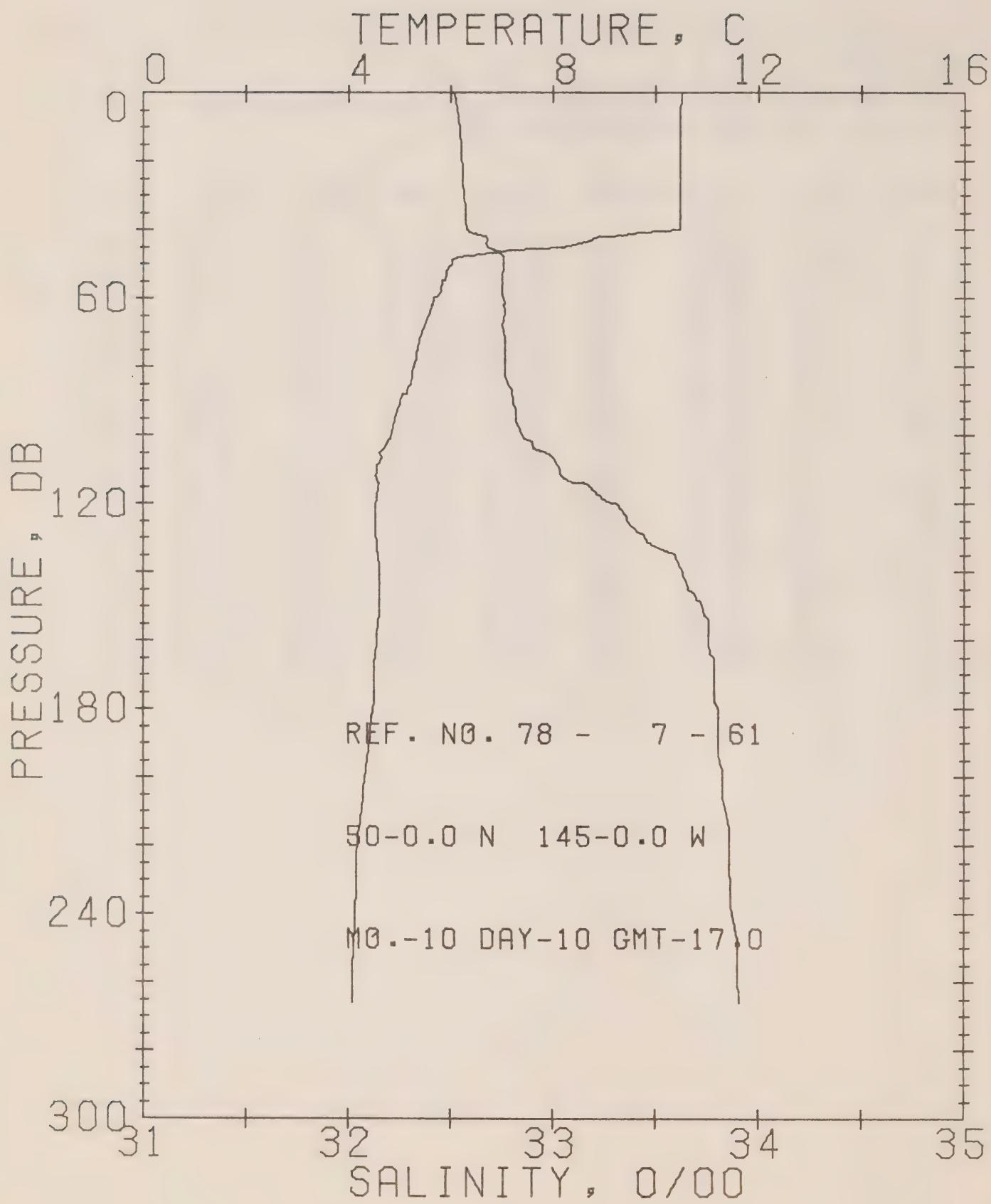
REFERENCE NO. 78- 7- 59 DATE 9/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 302 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.83	32.54	0	24.92	304.8	.00	.00	1490.
10	10.81	32.55	10	24.93	303.9	.30	.02	1490.
20	10.82	32.56	20	24.93	303.6	.61	.06	1491.
30	10.81	32.55	30	24.93	304.3	.91	.14	1491.
50	6.40	32.75	50	25.75	225.9	1.48	.37	1475.
75	5.23	32.78	75	25.92	210.3	2.02	.71	1470.
100	4.71	32.82	99	26.00	202.0	2.54	1.17	1469.
125	4.51	33.33	124	26.43	161.9	3.00	1.70	1469.
150	4.64	33.68	149	26.69	137.2	3.37	2.22	1470.
175	4.63	33.78	174	26.77	129.9	3.70	2.77	1471.
200	4.46	33.82	199	26.82	125.3	4.02	3.38	1470.
225	4.32	33.84	223	26.86	122.4	4.33	4.05	1470.
250	4.19	33.88	248	26.90	118.4	4.63	4.78	1470.
300	4.05	33.92	298	26.94	114.6	5.22	6.41	1471.
400	3.92	34.03	397	27.05	105.7	6.32	10.32	1472.
500	3.75	34.13	496	27.14	97.2	7.33	14.96	1473.
600	3.58	34.20	595	27.22	90.8	8.26	20.20	1474.
800	3.20	34.30	793	27.33	80.9	9.98	32.40	1476.
1000	2.93	34.37	990	27.41	74.0	11.52	46.50	1478.
1200	2.66	34.43	1188	27.48	67.8	12.93	62.33	1480.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 61

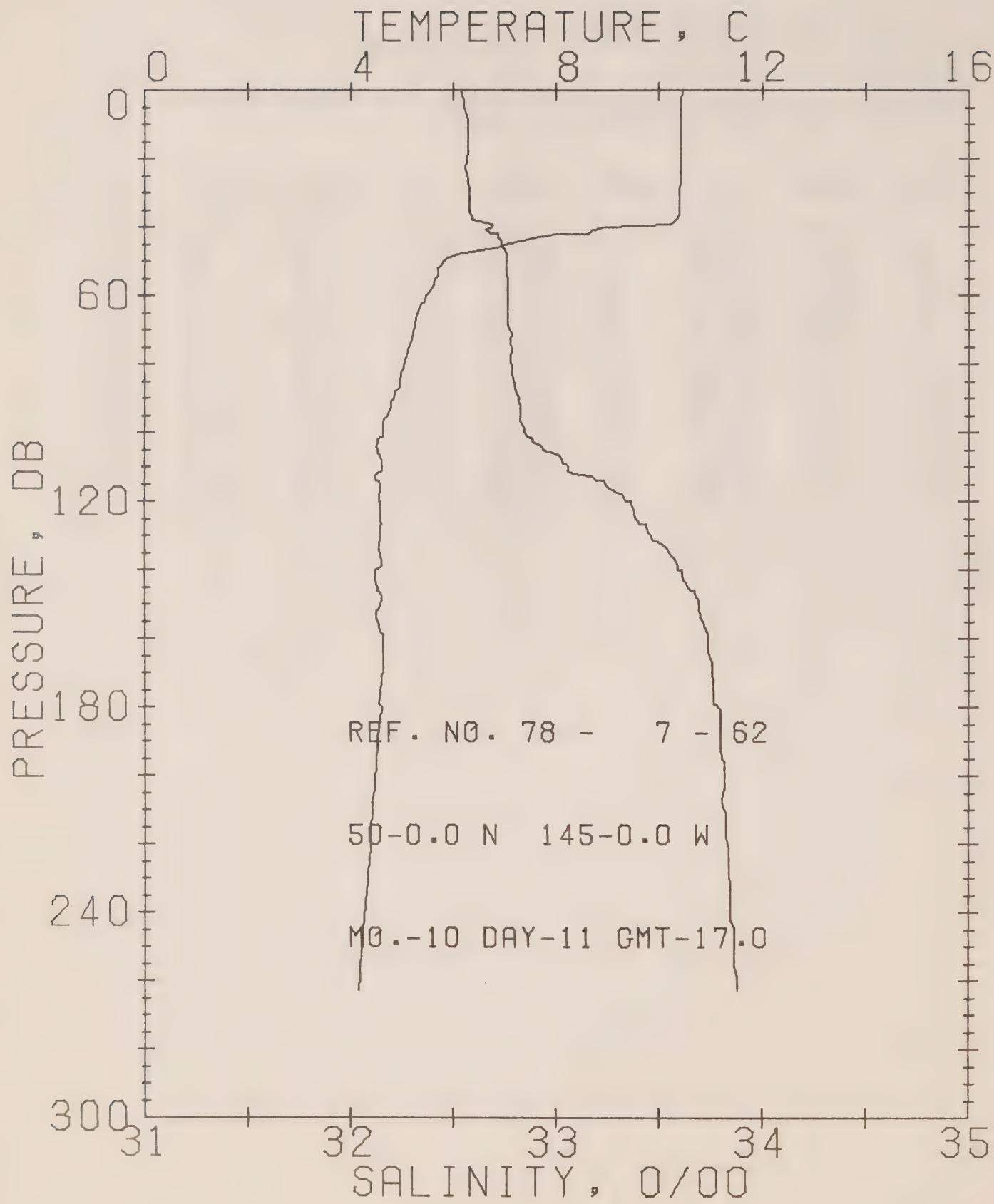
DATE 10/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 148 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.50	32.52	0	24.96	300.8	.00	.00	1489.
10	10.49	32.54	10	24.98	299.1	.30	.02	1489.
20	10.49	32.55	20	24.99	298.4	.60	.06	1489.
30	10.48	32.57	30	24.99	297.7	.90	.14	1490.
50	6.02	32.76	50	25.81	220.6	1.44	.36	1473.
75	5.36	32.77	75	25.89	212.5	1.99	.70	1471.
100	4.84	32.85	99	26.01	201.1	2.50	1.16	1469.
125	4.53	33.36	124	26.45	159.8	2.95	1.68	1469.
150	4.61	33.72	149	26.73	133.5	3.32	2.18	1470.
175	4.50	33.79	174	26.80	127.8	3.64	2.72	1470.
200	4.32	33.83	199	26.85	123.1	3.95	3.32	1470.
225	4.16	33.86	223	26.89	119.4	4.26	3.97	1470.
250	4.10	33.90	248	26.92	116.0	4.55	4.69	1470.



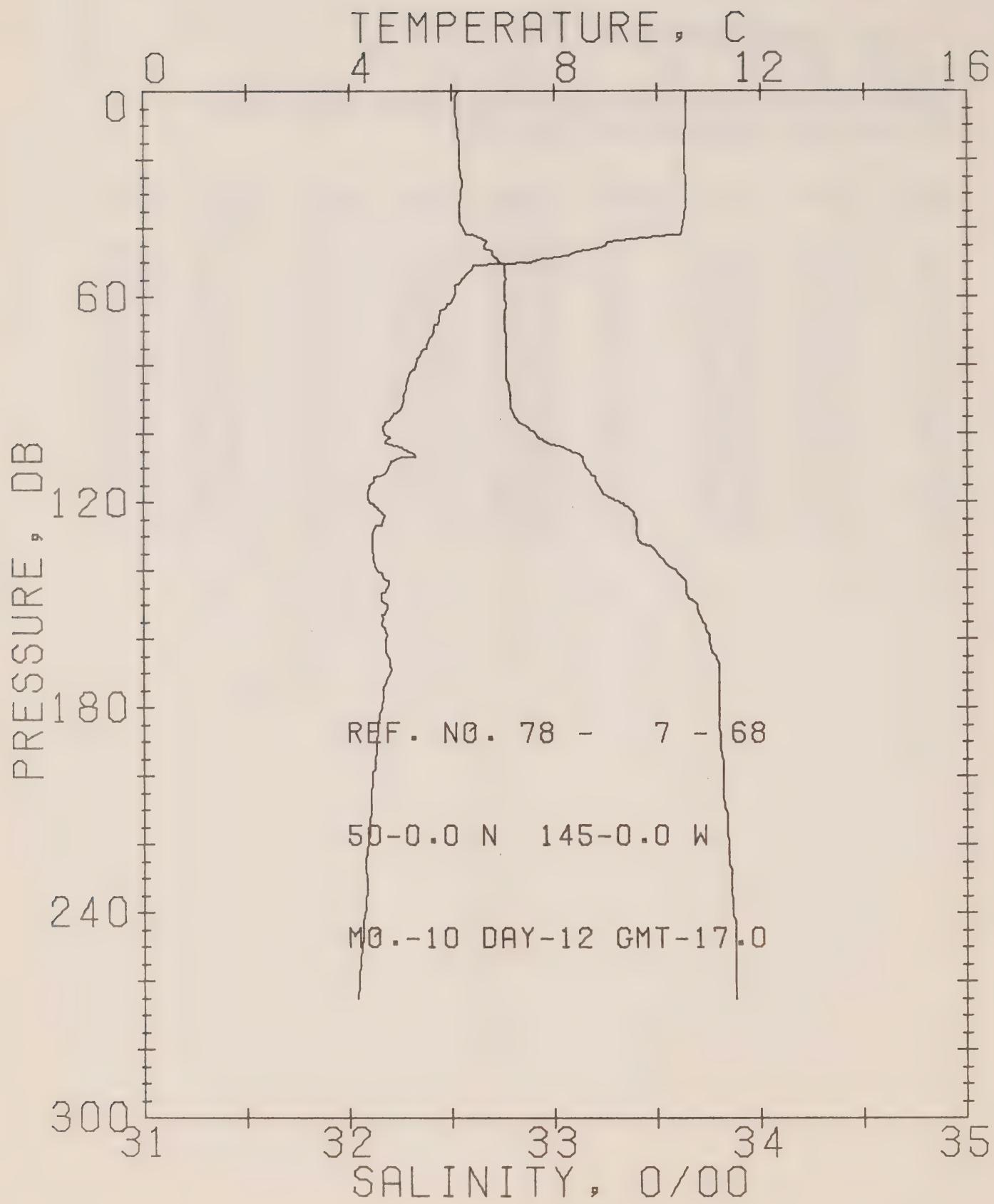
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 62 DATE 11/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 183 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.46	32.54	0	24.98	298.7	.00	.00	1489.
10	10.43	32.57	10	25.01	296.2	.30	.02	1489.
20	10.42	32.57	20	25.01	296.5	.59	.06	1489.
30	10.41	32.58	30	25.02	295.5	.89	.14	1489.
50	5.82	32.76	50	25.83	218.2	1.42	.35	1472.
75	5.15	32.78	75	25.93	209.0	1.95	.69	1470.
100	4.63	32.85	99	26.04	198.9	2.46	1.14	1468.
125	4.59	33.39	124	26.47	158.2	2.91	1.65	1469.
150	4.58	33.69	149	26.71	135.9	3.27	2.15	1470.
175	4.58	33.77	174	26.77	130.1	3.60	2.70	1470.
200	4.49	33.82	199	26.82	125.6	3.92	3.31	1471.
225	4.37	33.84	223	26.85	123.1	4.23	3.99	1471.
250	4.23	33.87	248	26.89	119.6	4.53	4.72	1470.



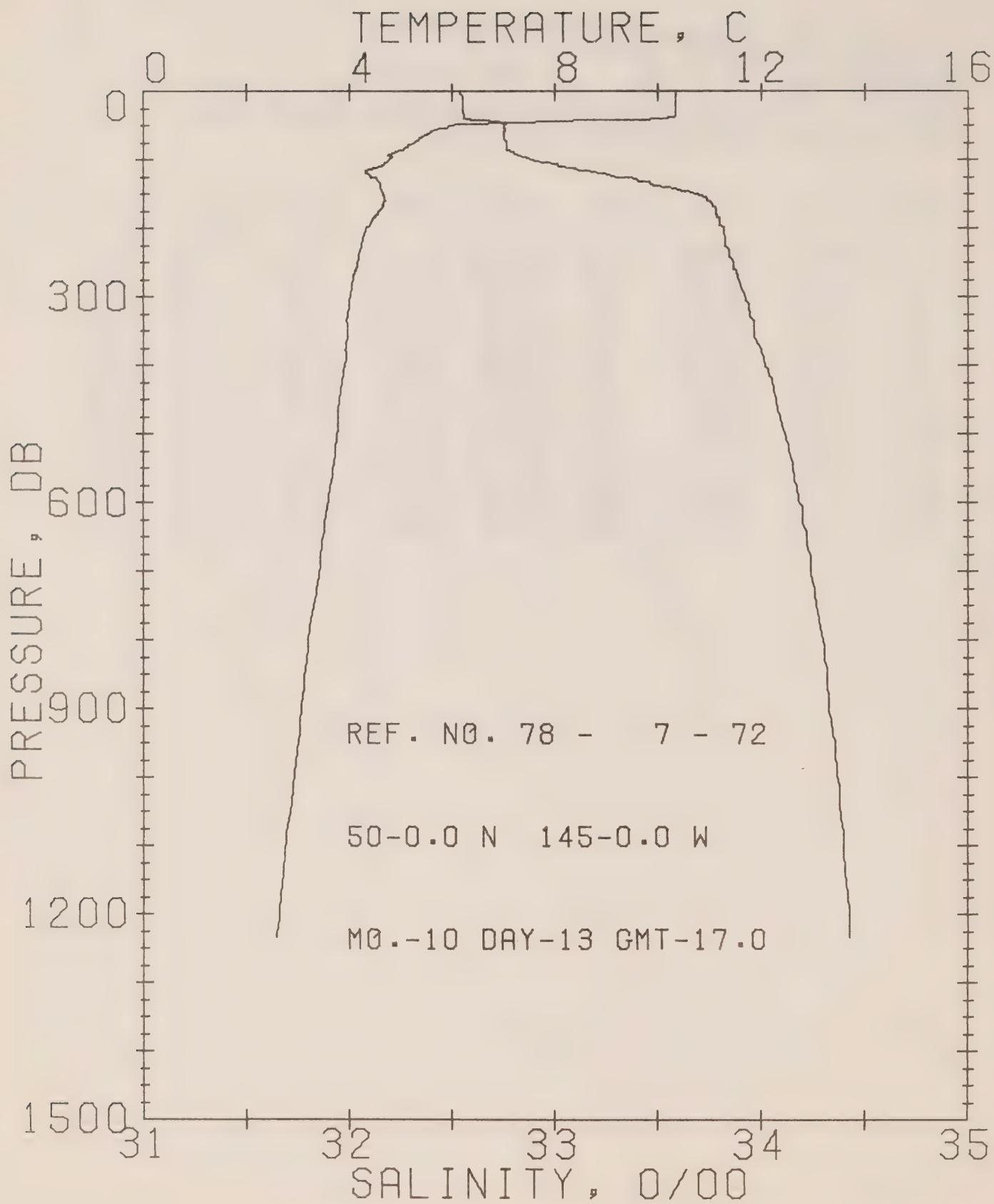
OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 68 DATE 12/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 185 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	DELTA	POT.	SOUND
				T		D	EN	
0	10.57	32.53	0	24.95	301.2	.00	.00	1489.
10	10.55	32.53	10	24.95	301.2	.30	.02	1489.
20	10.54	32.54	20	24.97	300.4	.60	.06	1490.
30	10.55	32.55	30	24.97	300.3	.90	.14	1490.
50	7.54	32.73	50	25.58	242.0	1.47	.37	1479.
75	5.51	32.77	75	25.88	214.2	2.02	.72	1471.
100	4.70	32.91	99	26.08	195.1	2.54	1.18	1469.
125	4.68	33.40	124	26.47	158.4	2.98	1.68	1470.
150	4.74	33.69	149	26.69	137.6	3.35	2.19	1471.
175	4.67	33.80	174	26.78	128.8	3.68	2.74	1471.
200	4.46	33.82	199	26.82	125.3	4.00	3.35	1470.
225	4.31	33.85	223	26.86	121.7	4.31	4.02	1470.
250	4.23	33.88	248	26.90	118.8	4.61	4.75	1470.



## OFFSHORE OCEANOGRAPHY GROUP

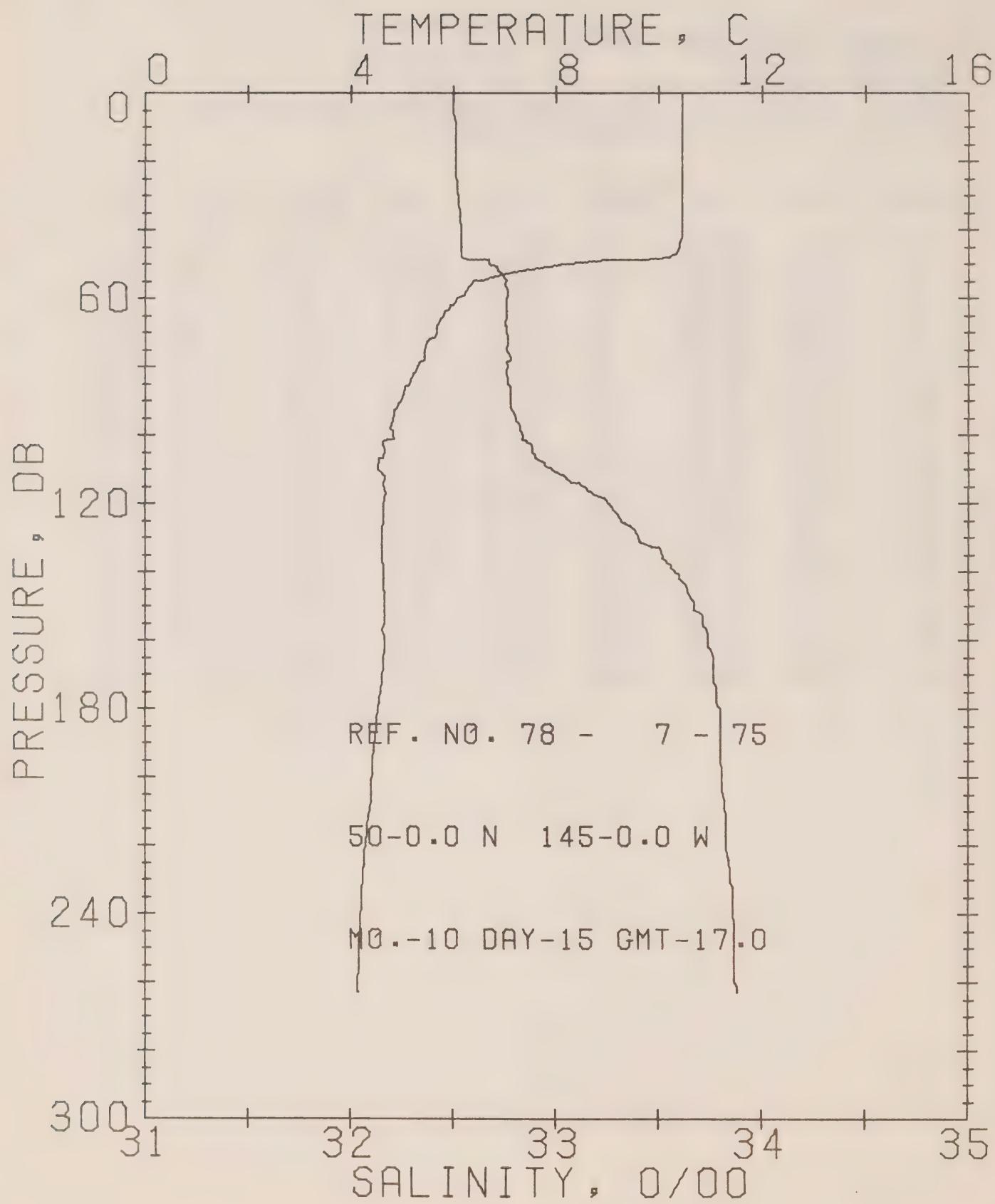
REFERENCE NO. 78- 7- 72 DATE 13/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 271 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.34	32.54	0	25.00	296.7	.00	.00	1488.
10	10.34	32.55	10	25.01	296.2	.30	.02	1489.
20	10.34	32.55	20	25.01	296.4	.59	.06	1489.
30	10.34	32.55	30	25.01	296.6	.89	.14	1489.
50	5.96	32.75	50	25.81	220.6	1.44	.36	1473.
75	5.26	32.77	75	25.90	211.4	1.97	.70	1470.
100	4.76	32.89	99	26.06	196.9	2.49	1.16	1469.
125	4.44	33.30	124	26.41	163.4	2.94	1.67	1468.
150	4.67	33.69	149	26.70	136.8	3.31	2.19	1470.
175	4.57	33.78	174	26.78	129.2	3.64	2.74	1470.
200	4.34	33.82	199	26.84	124.0	3.96	3.35	1470.
225	4.24	33.83	223	26.85	122.5	4.27	4.01	1470.
250	4.16	33.87	248	26.89	119.0	4.57	4.74	1470.
300	4.02	33.92	298	26.95	113.9	5.15	6.38	1470.
400	3.92	34.02	397	27.04	106.5	6.25	10.30	1472.
500	3.77	34.11	496	27.13	98.6	7.28	14.98	1473.
600	3.60	34.18	595	27.20	92.3	8.23	20.32	1474.
800	3.21	34.30	793	27.33	81.1	9.96	32.62	1476.
1000	2.93	34.37	990	27.41	73.8	11.51	46.81	1478.
1200	2.63	34.43	1188	27.49	67.5	12.92	62.61	1480.



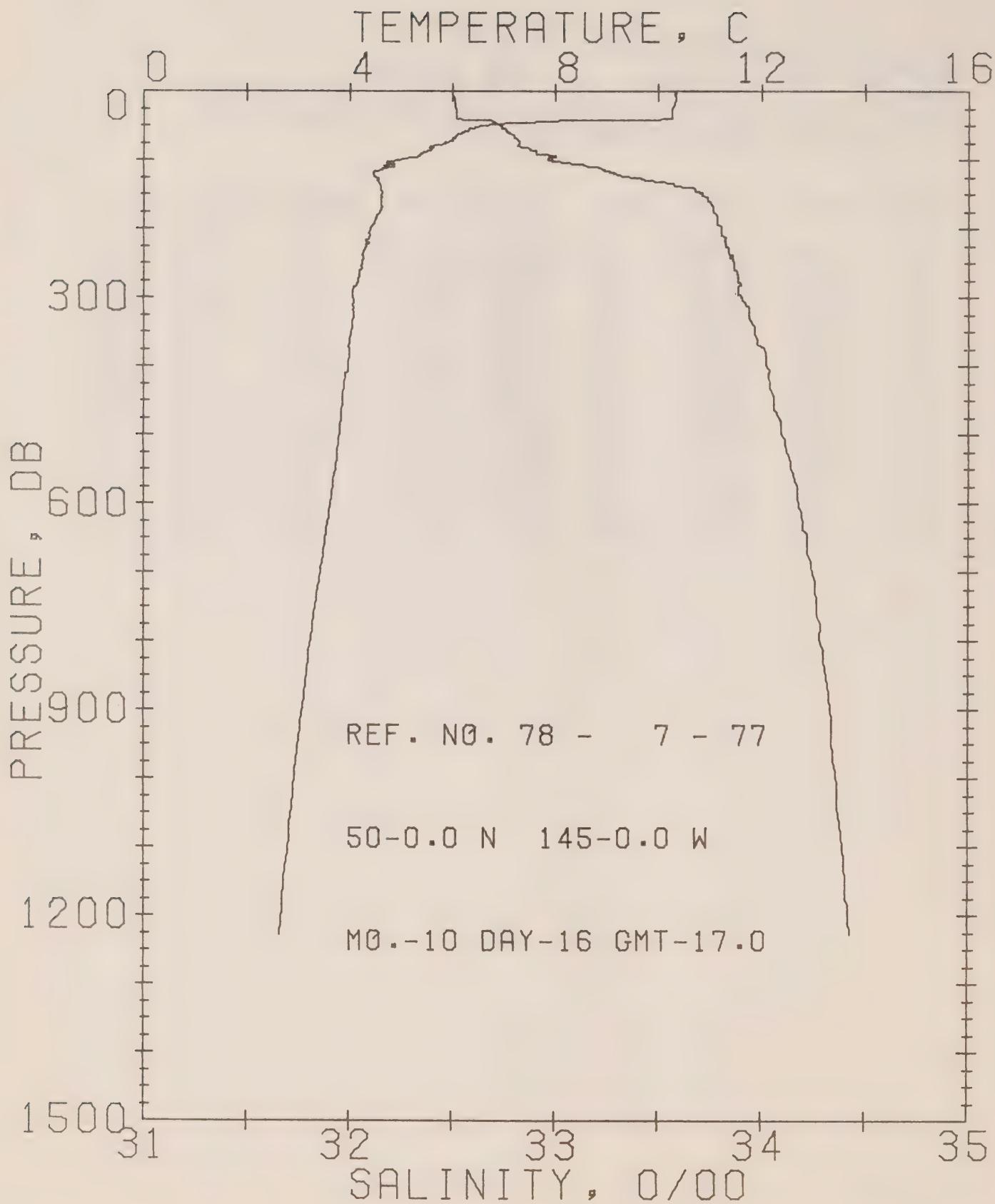
OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 75 DATE 15/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 182 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.44	32.50	0	24.95	301.3	.00	.00	1489.
10	10.44	32.51	10	24.96	300.8	.30	.02	1489.
20	10.46	32.51	20	24.96	301.2	.60	.06	1489.
30	10.45	32.52	30	24.96	300.6	.90	.14	1489.
50	8.20	32.67	50	25.44	255.6	1.50	.38	1481.
75	5.44	32.76	75	25.88	214.2	2.05	.73	1471.
100	4.83	32.84	99	26.01	201.7	2.58	1.20	1409.
125	4.63	33.32	124	26.41	163.9	3.03	1.72	1469.
150	4.67	33.67	149	26.68	138.3	3.40	2.24	1470.
175	4.58	33.78	174	26.78	129.4	3.74	2.79	1470.
200	4.42	33.81	199	26.82	125.6	4.05	3.39	1470.
225	4.26	33.84	223	26.86	121.9	4.36	4.06	1470.
250	4.16	33.87	248	26.89	118.9	4.66	4.79	1470.



## OFFSHORE OCEANOGRAPHY GROUP

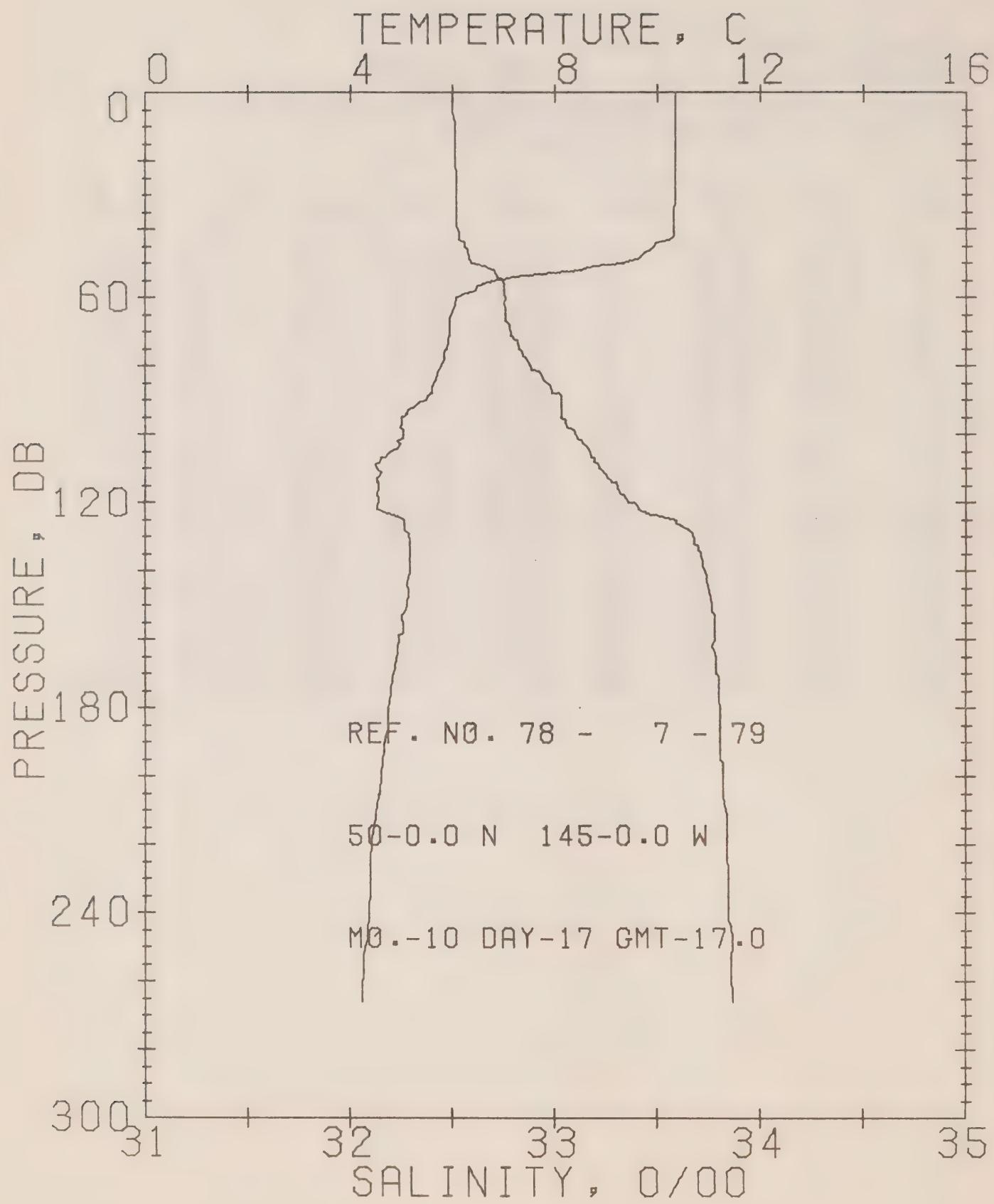
REFERENCE NO. 78- 7- 77 DATE 16/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 312 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.35	32.50	0	24.97	299.8	.00	.00	1488.
10	10.34	32.51	10	24.98	299.2	.30	.02	1489.
20	10.33	32.51	20	24.98	299.2	.60	.06	1489.
30	10.26	32.52	30	25.00	297.6	.90	.14	1489.
50	6.68	32.73	50	25.70	230.8	1.45	.36	1476.
75	5.85	32.83	75	25.88	213.6	2.00	.71	1473.
100	4.90	32.99	99	26.12	191.2	2.51	1.16	1470.
125	4.56	33.39	124	26.47	157.9	2.94	1.66	1469.
150	4.62	33.71	149	26.72	134.8	3.30	2.16	1470.
175	4.58	33.77	174	26.77	130.1	3.63	2.71	1470.
200	4.39	33.81	199	26.82	125.3	3.95	3.32	1470.
225	4.31	33.83	223	26.85	123.2	4.26	3.99	1470.
250	4.23	33.87	248	26.89	119.6	4.56	4.72	1470.
300	4.06	33.90	298	26.93	116.0	5.15	6.37	1471.
400	3.98	34.03	397	27.04	106.6	6.26	10.32	1472.
500	3.81	34.09	496	27.11	100.4	7.29	15.05	1473.
600	3.63	34.18	595	27.19	93.1	8.26	20.45	1474.
800	3.24	34.28	793	27.31	82.6	10.00	32.81	1470.
1000	2.93	34.36	990	27.41	74.5	11.56	47.10	1478.
1200	2.67	34.42	1188	27.47	68.7	12.99	63.12	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 79

DATE 17/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 184 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.36	32.50	0	24.96	300.0	.00	.00	1489.
10	10.34	32.51	10	24.98	299.1	.30	.02	1489.
20	10.34	32.51	20	24.98	299.1	.60	.06	1489.
30	10.34	32.52	30	24.98	298.8	.90	.14	1489.
50	9.32	32.59	50	25.21	277.9	1.49	.38	1486.
75	5.90	32.83	75	25.88	214.2	2.05	.74	1473.
100	5.05	33.10	99	26.19	184.6	2.55	1.18	1470.
125	5.06	33.59	124	26.57	148.3	2.97	1.66	1471.
150	5.12	33.77	149	26.71	135.8	3.32	2.15	1472.
175	4.80	33.80	174	26.77	130.2	3.65	2.70	1471.
200	4.61	33.82	199	26.81	126.9	3.98	3.31	1471.
225	4.41	33.84	223	26.85	123.2	4.29	3.99	1471.
250	4.30	33.87	248	26.88	120.3	4.59	4.73	1471.

120

TEMPERATURE, C

PRESSURE, DB

0

4

8

12

16

60

120

180

240

300

31

32

33

34

35

SALINITY, P/00

REF. NO. 78 - 7 - 81

50-0.0 N 145-0.0 W

MO.-10 DAY-18 GMT-17-0

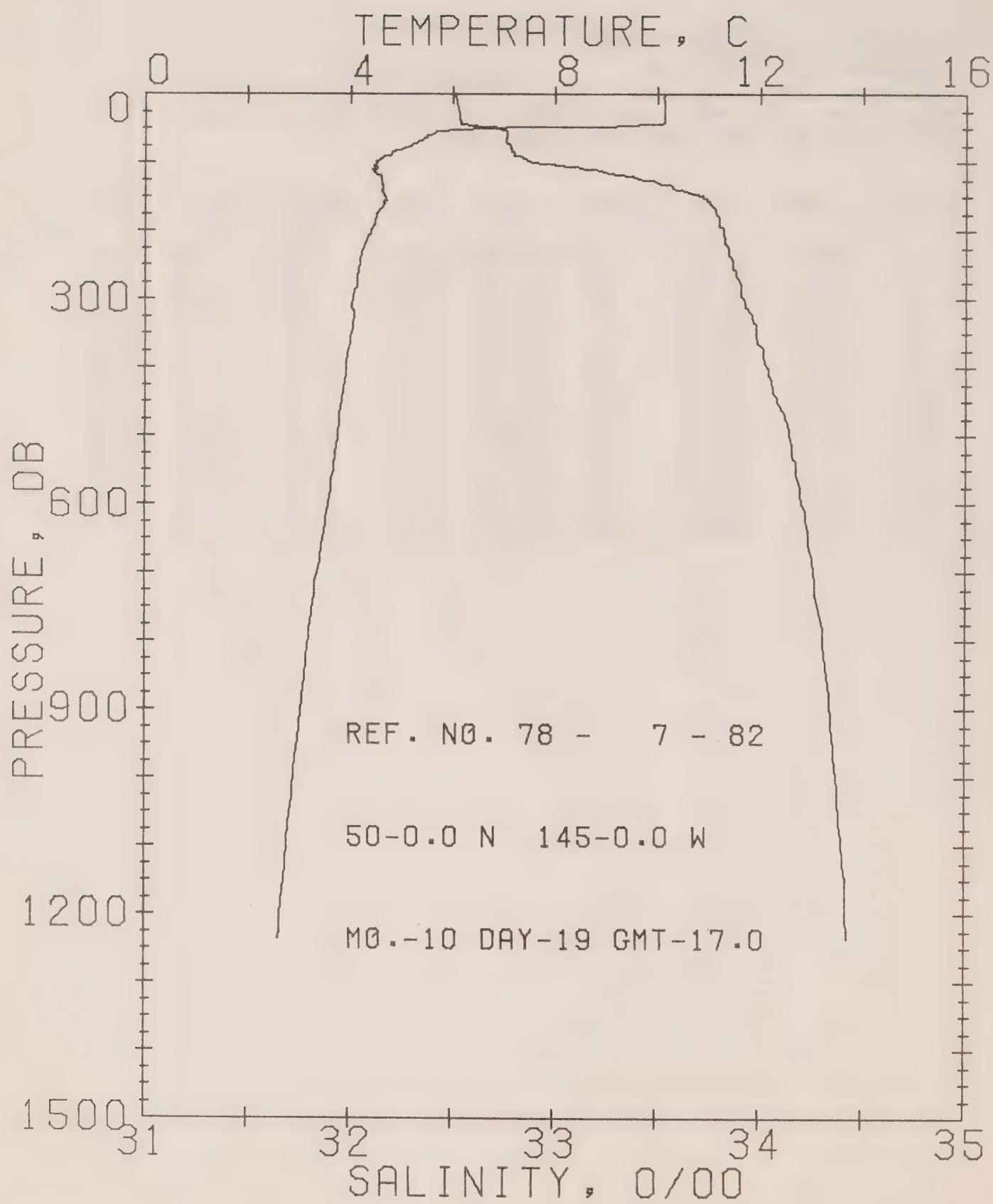
OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 81 DATE 18/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 162 POINTS TAKEN FROM ANALOG TRACE  
GUIDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA	SVA	DELTA	POT.	SOUND
				T		D	EN	
0	10.44	32.50	0	24.95	301.3	.00	.00	1489.
10	10.43	32.51	10	24.96	300.3	.30	.02	1489.
20	10.43	32.52	20	24.97	300.0	.60	.06	1489.
30	10.42	32.52	30	24.97	300.1	.90	.14	1489.
50	6.02	32.75	50	25.80	221.3	1.47	.37	1473.
75	5.24	32.77	75	25.91	211.2	2.01	.71	1470.
100	4.65	32.84	99	26.02	200.1	2.52	1.17	1468.
125	4.40	33.33	124	26.44	160.7	2.98	1.69	1468.
150	4.70	33.72	149	26.72	135.1	3.34	2.20	1471.
175	4.58	33.78	174	26.78	129.4	3.67	2.74	1470.
200	4.39	33.82	199	26.83	124.6	3.99	3.35	1470.
225	4.24	33.84	223	26.86	121.7	4.30	4.02	1470.
250	4.15	33.88	248	26.90	118.2	4.60	4.75	1470.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 82

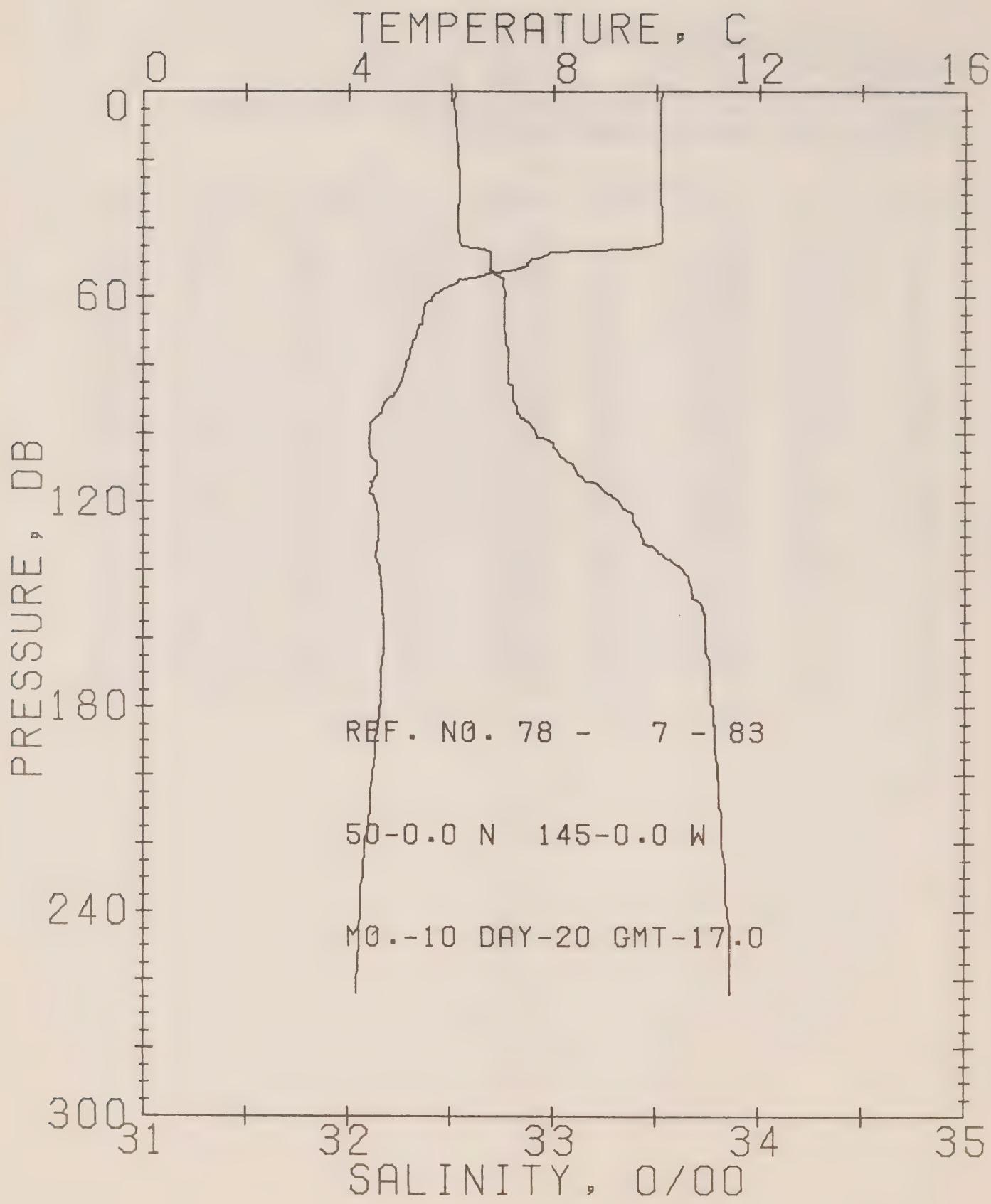
DATE 19/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 256 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.14	32.51	0	25.01	295.7	.00	.00	1488.
10	10.13	32.52	10	25.02	295.0	.30	.02	1488.
20	10.13	32.52	20	25.02	294.9	.59	.06	1488.
30	10.13	32.53	30	25.03	294.7	.89	.14	1488.
50	7.02	32.70	50	25.63	237.0	1.46	.37	1477.
75	5.16	32.78	75	25.92	209.6	2.00	.71	1470.
100	4.53	32.90	99	26.09	194.1	2.51	1.16	1468.
125	4.60	33.44	124	26.51	154.6	2.94	1.65	1469.
150	4.69	33.72	149	26.72	134.8	3.30	2.16	1470.
175	4.51	33.78	174	26.79	128.4	3.62	2.70	1470.
200	4.40	33.82	199	26.83	124.7	3.94	3.31	1470.
225	4.26	33.84	223	26.86	121.6	4.25	3.97	1470.
250	4.18	33.87	248	26.89	119.1	4.55	4.70	1470.
300	4.04	33.92	298	26.94	114.5	5.13	6.34	1470.
400	3.92	34.03	397	27.05	105.5	6.23	10.25	1472.
500	3.75	34.14	496	27.15	96.4	7.24	14.87	1473.
600	3.57	34.20	595	27.22	90.7	8.18	20.12	1474.
800	3.19	34.31	793	27.34	80.0	9.88	32.21	1476.
1000	2.90	34.37	990	27.42	73.5	11.41	46.24	1478.
1200	2.65	34.42	1188	27.48	68.5	12.82	62.06	1480.



OFFSHORE OCEANOGRAPHY GROUP

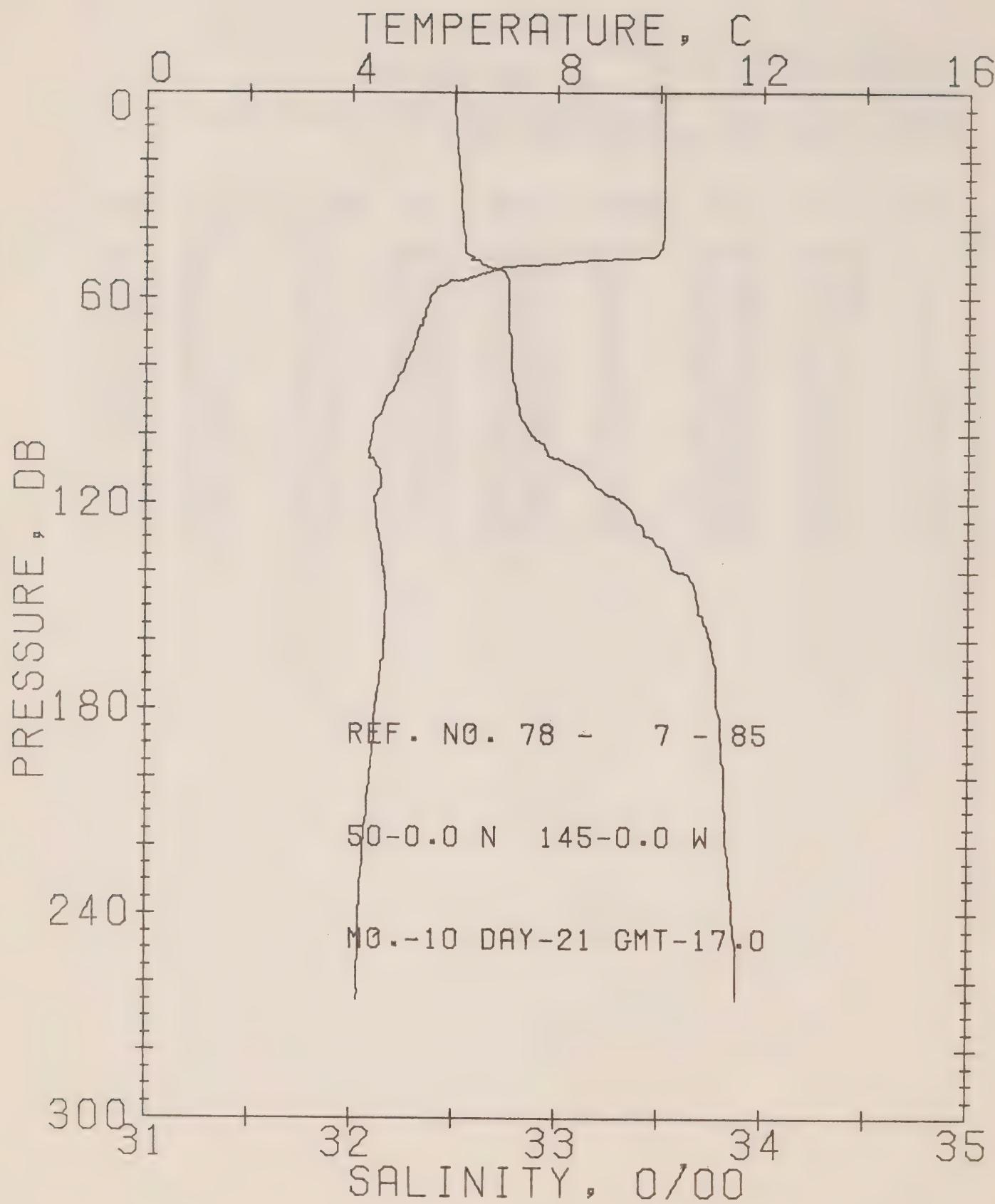
REFERENCE NO. 78- 7- 83 DATE 20/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 164 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.10	32.52	0	25.02	294.4	.00	.00	1488.
10	10.09	32.52	10	25.03	294.4	.29	.02	1488.
20	10.09	32.53	20	25.04	293.6	.59	.06	1488.
30	10.09	32.54	30	25.04	293.5	.88	.13	1488.
50	7.48	32.69	50	25.56	244.2	1.45	.37	1479.
75	5.19	32.78	75	25.92	209.9	2.00	.71	1470.
100	4.42	32.91	99	26.11	191.8	2.51	1.17	1467.
125	4.58	33.39	124	26.47	158.1	2.94	1.66	1469.
150	4.67	33.72	149	26.72	134.6	3.31	2.17	1470.
175	4.63	33.77	174	26.77	130.6	3.64	2.72	1471.
200	4.48	33.80	199	26.81	127.0	3.96	3.34	1471.
225	4.30	33.83	223	26.85	122.9	4.28	4.02	1470.
250	4.21	33.86	248	26.88	120.1	4.58	4.75	1470.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 85

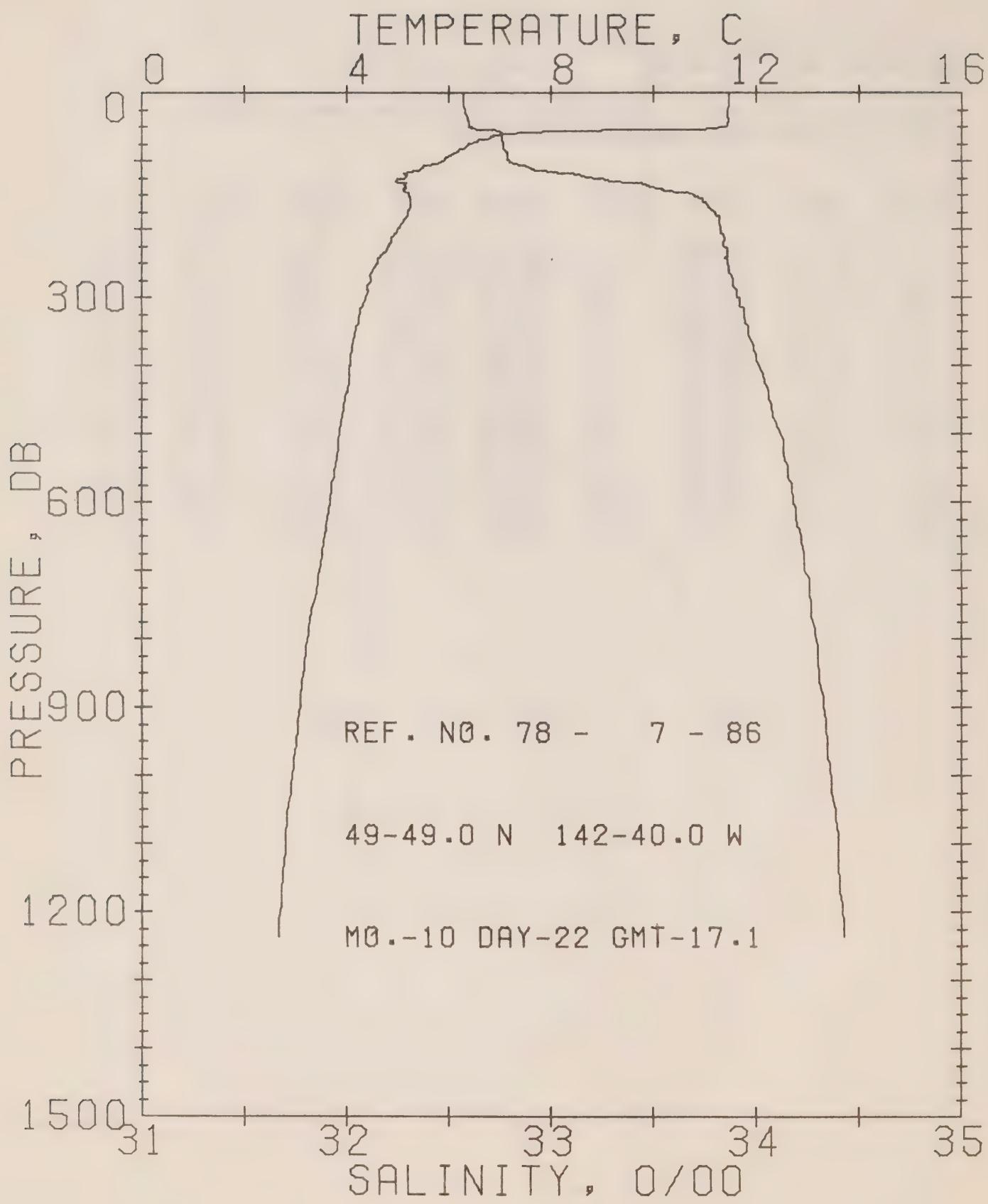
DATE 21/10/78

POSITION 50- .0N, 145- .0W GMT 17.0

RESULTS OF STP CAST 161 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.08	32.50	0	25.01	295.5	.00	.00	1487.
10	10.08	32.50	10	25.02	295.3	.30	.02	1488.
20	10.08	32.52	20	25.02	294.7	.59	.06	1488.
30	10.08	32.53	30	25.04	293.9	.88	.14	1488.
50	7.91	32.63	50	25.45	254.5	1.47	.37	1480.
75	5.20	32.78	75	25.92	210.0	2.01	.72	1470.
100	4.41	32.88	99	26.08	194.4	2.52	1.17	1467.
125	4.50	33.39	124	26.48	157.3	2.95	1.67	1469.
150	4.69	33.69	149	26.70	137.0	3.32	2.18	1470.
175	4.53	33.78	174	26.78	128.8	3.65	2.72	1470.
200	4.37	33.82	199	26.83	124.4	3.96	3.33	1470.
225	4.23	33.84	223	26.87	121.5	4.27	3.99	1470.
250	4.15	33.88	248	26.90	118.0	4.57	4.72	1470.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 7- 86

DATE 22/10/78

POSITION 49-49.0N, 142-40.0W GMT 17.1

RESULTS OF STP CAST 294 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.47	32.57	0	24.82	313.4	.00	.00	1493.
10	11.46	32.57	10	24.83	313.4	.31	.02	1493.
20	11.46	32.57	20	24.83	313.3	.63	.06	1493.
30	11.45	32.58	30	24.84	312.9	.94	.14	1493.
50	11.40	32.60	50	24.86	311.0	1.56	.40	1493.
75	6.39	32.77	75	25.77	224.6	2.18	.79	1475.
100	5.87	32.80	99	25.86	216.4	2.73	1.28	1473.
125	5.12	33.22	124	26.28	176.7	3.23	1.85	1471.
150	5.23	33.70	149	26.64	142.3	3.62	2.40	1473.
175	5.21	33.80	174	26.72	134.8	3.97	2.97	1473.
200	5.01	33.83	199	26.77	130.6	4.30	3.60	1473.
225	4.81	33.85	223	26.81	127.4	4.62	4.30	1472.
250	4.60	33.86	248	26.84	124.3	4.94	5.06	1472.
300	4.37	33.91	298	26.90	118.5	5.54	6.75	1472.
400	4.06	34.01	397	27.02	108.6	6.67	10.78	1472.
500	3.86	34.11	496	27.12	99.5	7.71	15.55	1473.
600	3.67	34.18	595	27.19	93.4	8.68	20.94	1474.
800	3.23	34.29	793	27.32	81.6	10.42	33.37	1476.
1000	2.93	34.37	990	27.41	74.4	11.98	47.67	1478.
1200	2.69	34.42	1188	27.47	68.8	13.41	63.64	1480.



Surface Salinity and Temperature Observations  
(P-78-7)

SURFACE SALINITY AND TEMPERATURE OBSERVATIONS  
CRUISE REFERENCE NUMBER 78- 7

DATE/TIME				SALINITY	TEMP	LONGITUDE
YR	MO	DY	GMT		C	WEST
78	9	8	1650	31.137		123-30
78	9	8	1810	31.202		124- 0
78	9	8	1925	31.455		124-30
78	9	8	2040	31.413		125- 0
78	9	8	2200	32.098	13.8	125-33
78	9	8	2200	32.132	13.8	125-33
78	9	8	2345	32.045	14.4	126- 0
78	9	9	135	32.087	14.7	126-40
78	9	9	405	32.005	15.7	127-40
78	9	9	650	31.998	15.3	128-40
78	9	9	930	32.066	15.7	129-40
78	9	9	1500	32.454	14.5	131-40
78	9	9	1750	32.261	15.8	132-40
78	9	9	2255	32.390		133-40
78	9	10	210	32.410	15.4	134-40
78	9	10	700	32.445	15.1	135-40
78	9	10	1210	32.483	14.8	136-40
78	9	10	1625	32.713	14.2	137-40
78	9	10	1935	32.522	13.8	138-40
78	9	10	2315	32.509		139-40
78	9	11	210	32.449	13.8	140-40
78	9	11	735	32.483		141-40
78	9	11	1040	32.623	13.7	142-40
78	9	11	0	32.482		143-40
78	9	12	0	32.532	13.2	ON STATION
78	9	13	0	32.554	12.9	ON STATION
78	9	14	0	32.550	13.0	ON STATION
78	9	15	0	32.560	12.1	ON STATION
78	9	16	0	32.570	12.0	ON STATION
78	9	17	0	32.588	12.1	ON STATION
78	9	18	0	32.478	12.2	ON STATION
78	9	19	0	32.485	12.3	ON STATION
78	9	20	0	32.533	12.1	ON STATION
78	9	21	0	32.527	11.7	ON STATION
78	9	22	0	32.537	16.6	ON STATION
78	9	23	0	32.522	11.7	ON STATION
78	9	24	0	32.525	12.2	ON STATION
78	9	25	0	32.533	11.7	ON STATION
78	9	26	0	32.544	11.5	ON STATION
78	9	27	0	32.524	11.6	ON STATION
78	9	28	0	32.522	11.7	ON STATION
78	9	29	0	32.519	11.7	ON STATION
78	9	30	0	32.529	11.6	ON STATION
78	10	4	0	32.518	11.6	ON STATION

SURFACE SALINITY AND TEMPERATURE OBSERVATIONS  
CRUISE REFERENCE NUMBER 78- 7

DATE/TIME YR MO DY GMT	SALINITY	TEMP C	LONGITUDE WEST
78 10 5 0	32.539	11.4	ON STATION
78 10 6 0	32.521	11.6	ON STATION
78 10 7 0	32.519	11.6	ON STATION
78 10 8 0	32.536	11.2	ON STATION
78 10 9 0	32.541	10.9	ON STATION
78 10 10 0	32.533	11.1	ON STATION
78 10 11 0	32.566	10.5	ON STATION
78 10 12 0	32.535	10.6	ON STATION
78 10 13 0	32.524	10.8	ON STATION
78 10 14 0	32.510	10.6	ON STATION
78 10 15 0	32.500	10.8	ON STATION
78 10 16 0	32.511	10.5	ON STATION
78 10 17 0	32.504	10.5	ON STATION
78 10 18 0	32.504	10.8	ON STATION
78 10 19 0	32.500	10.4	ON STATION
78 10 20 0	32.521	10.4	ON STATION
78 10 21 0	32.498	10.4	ON STATION
78 10 22 0	32.514	10.6	ON STATION
78 10 22 1200	32.501		143-40
78 10 22 1705	32.562	11.4	142-40
78 10 22 2200	32.550		141-40
78 10 23 20	32.553	11.8	140-40
78 10 23 230	32.535		139-40
78 10 23 545	32.645	12.1	138-40
78 10 23 715	32.578		137-40
78 10 23 930	32.510	12.6	136-40
78 10 23 1155	32.415		135-40
78 10 23 1415	32.433	13.1	134-40
78 10 23 1635	32.423		133-40
78 10 23 1900	32.513	13.5	132-40
78 10 23 2120	32.477		131-40
78 10 23 2345	32.421	13.8	130-40
78 10 24 230	32.445		129-40
78 10 24 435	32.125	13.9	128-40
78 10 24 655	32.099	14.2	127-40
78 10 24 915	32.181	13.9	126-40
78 10 24 1055	31.276	11.9	126- 0
78 10 24 1200	31.833	10.9	125-33
78 10 24 1316	31.901		125- 0
78 10 24 1433	31.855		124-30
78 10 24 1550	32.030		124- 0
78 10 24 1700	30.712		123-30

LIST OF OMISSIONS

## Hydrographic Data:

Consec #	Depth (m)	T	S	O <sub>2</sub>	Notes			Comments
					1	2	3	
3	973		*			*		
7	52		*			*		
11	3426		*	*		*		Bottle leaked

## Notes (MacNeill, 1977):

1. The data is suspect because of a reversal of gradient by greater than .01<sup>o</sup>/oo (salinity) or greater than .08 ml/litre (oxygen).
2. The data is deleted because of very irregular data values (usually a mistripping or leaking bottle if both oxygen and salinity are irregular).
3. The data is deleted because duplicate samples at a depth were not within .01<sup>o</sup>/oo (salinity) or .08 ml/litre (oxygen).

## STD Data:

no omissions

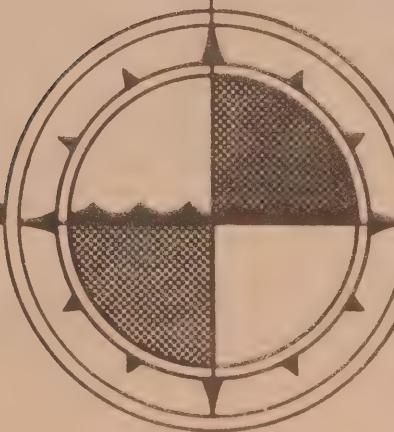
Note: Consecutive numbers 28 to 32, 46 to 49 and 63 to 67 are STD's taken as part of the MILE program and are not included in this report.





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OCEANOGRAPHIC OBSERVATIONS AT OCEAN STATION P  
20 October - 6 December 1978  
VOLUME 95



INSTITUTE OF OCEAN SCIENCES, PATRICIA BAY  
Sidney, B.C.

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OCEANOGRAPHIC OBSERVATIONS AT OCEAN STATION P

20 October - 6 December 1978

VOLUME 95

Institute of Ocean Sciences, Patricia Bay

Sidney, B.C.

1979

This is a manuscript which has received only limited circulation. On citing this report in a bibliography, the title should be followed by the words "UNPUBLISHED MANUSCRIPT" which is in accordance with accepted bibliographic custom.

## ABSTRACT

Physical, chemical and biological oceanographic observations are made from the weathership at Ocean Weather Station Papa, and between Esquimalt and Station Papa, on a routine continuing basis. Physical oceanography data only are shown, including surface observations and profiles obtained with bottle casts and conductivity-temperature-pressure instruments.



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## INTRODUCTION

Canadian operation of Ocean Weather Station P (latitude  $50^{\circ}00'N$ , Longitude  $145^{\circ}00'W$ ) was inaugurated in December, 1950. The station is occupied primarily to make meteorological observations of the surface and upper air and to provide an air-sea rescue service. The station is manned by two vessels operated by the Marine Services Branch of the Ministry of Transport. They are the CCGS Vancouver and the CCGS Quadra. Each ship remains on station for a period of six weeks, and is then relieved by the alternate ship, thus maintaining a continuous watch.

Bathythermograph observations have been made at Station P since July, 1952. A program of more extensive oceanographic observations commenced in August 1956. This was extended in April, 1959 by the addition of a series of oceanographic stations along the route to and from Station P and Swiftsure Bank. These stations are known as Line P stations. The number of stations on Line P has been increased twice and now consists of twelve stations (Fig. 1). Bathythermograph observations and surface salinity sample collections, in addition to being made on Line P oceanographic stations, are also made at odd meridians at  $40'$ , i.e.  $139^{\circ}40'W$ ,  $141^{\circ}40'W$ , etc. These stations are known as Line P BT stations. Data observed prior to 1968 have been indexed by Collins et al (1969).

The present record includes STD and surface salinity and temperature data collected from the CCGS Vancouver during the period 20 October to 6 December 1978.

All physical oceanographic data have been stored by the Marine Environmental Data Services Branch (MEDS), Department of Fisheries and Oceans, 240 Sparks Street, 7<sup>th</sup> Floor West, Ottawa, Ontario, Canada, K1A 0E6. Requests for these data should be directed to MEDS.

Biological and productivity data are published in the Manuscript Report series of the Department of Fisheries and Oceans (DFO), Pacific Biological Station, Nanaimo, British Columbia, Canada. Requests for these data should be directed to DFO.

Marine geochemical data are for the Ocean Chemistry Division, Department of Fisheries and Oceans, Institute of Ocean Sciences, P.O. Box 6000, Sidney, B.C., V8L 4B2.

PROGRAM OF OBSERVATION FROM CCGS VANCOUVER, 20 October - 6 December 1978 (P-78-8)  
(MEDS Ref. No. 15-78-008)

Oceanographic observations were made by the officers and crew of the CCGS Vancouver.

En Route to Station P

STD casts were taken at Line P stations 6,7 and 10.

Surface bucket or seawater loop samples for salinity were taken.

The surface temperature recorder and thermosalinograph were run continuously.

BT's or XBT's were taken at all whole and half Line P stations.

On Station P

The oceanographic program was carried out as follows:

Physical Oceanography

- 1) Thirty STD casts to 1400 metres were taken.
- 2) BT's or XBT's were taken every three hours to coincide with meteorological observations, encoded and transmitted according to the IGOSS format.

Marine Geochemistry

- 1) Forty-two air CO<sub>2</sub> samples.
- 2) Twenty PCO<sub>2</sub> samples.
- 3) Twenty alkalinity samples.
- 4) Twenty-five total CO<sub>2</sub> samples.
- 5) Sixty-one nutrient samples.
- 6) One tritium sample.

Biological Oceanography

- 1) Samples were obtained from 150 metre vertical plankton hauls.

### En Route from Station P

STD casts were taken at Line P stations 12 through 4.

Surface bucket or seawater loop samples for salinity were taken.

The surface temperature recorder and thermosalinograph were run continuously.

BT's or XBT's were taken at whole and half Line P stations 12½ through 4.

### Observations for Other Agencies

- 1) Marine mammal observations were made by the ship's officers for Mr. I. McAskie, Department of Fisheries and Oceans, Pacific Biological Station, Nanaimo, B.C., Canada.
- 2) Bird observations were made by the ship's officers for Dr. M. Myres, University of Alberta, Calgary, Alberta, Canada and Mr. J. Guiget, Curator of Birds and Mammals, Provincial Museum, Department of Provincial Secretary and Travel Industry, Victoria, British Columbia, Canada.
- 3) Air CO<sub>2</sub> samples were taken weekly in duplicate for Scripps Institution of Oceanography, La Jolla, California, U.S.A.

Data were processed for publication by Interact Computing Services Ltd., Victoria, B.C.

### OBSERVATIONAL PROCEDURES

The daily surface water temperatures were measured from a bucket sample using a deck thermometer of ±0.1°C accuracy. The daily surface salinity samples were obtained from the seawater loop. When the seawater loop was not operational these samples were obtained with a bucket, and are indicated with a '\*' in this data record.

Salinity determinations were made ashore with a Guildline Autosal salinometer. Accuracy using duplicated determinations is estimated to be ±0.003‰.

Line P engine intake continuous temperature on both ships was recorded by a Honeywell Electronik 15 Recorder. The temperature probe is at a depth of approximately 3 metres below the sea surface and the instrument accuracy is believed to be ± 0.1°C.

Each ship is equipped with a Plessey Model 6600-T thermosalinograph which is used, on Line P, for continuous recording of surface temperatures and salinities from the ship's seawater loop. The temperature probe is mounted at the seawater loop intake (approximately 3 metres below the surface) and the salinity probe and recorder are situated in the dry lab. The accuracy

of this instrument is believed to be  $\pm 0.1^{\circ}\text{C}$  for temperature and  $\pm 0.1^{\circ}/\text{oo}$  for salinity.

STD profiles were taken with a Guildline Model 8700 STP system.

### COMPUTATIONS

Analog traces from the salinity-temperature-pressure instrument have been digitized using a Hewlett-Packard (HP) 9821A calculator and an HP 9864A digitizer, then replotted by an HP 9862A plotter. Digitization was continued until original and computer plotted traces were coincident.

The HP 9821A was then connected to an HP 2116 minicomputer and the digitized data transferred to 9-track tape. Using a UNIVAC 1106 computer the data was listed and obvious spikes removed, then a correction was applied.

Generally the correction is determined by comparison with hydrographic casts of the same cruise. As no hydrographic casts were taken, the STD data was compared with hydrographic casts, taken at station P, from the latter part of cruise 78007. Also a comparison was made with the mean of all hydrographic cast data taken at station P, during the month of November, between 1956 and 1976. Due to the manner in which the correction was determined no estimate of error is given.

Correction applied to STD data to produce data in this report:

PRESS	TEMP	SAL
0db	$-0.50^{\circ}\text{C}$	$-0.13^{\circ}/\text{oo}$
1200db	$+0.25^{\circ}\text{C}$	$-0.12^{\circ}/\text{oo}$

For other pressures, linear interpolation was used

STD casts 21 and 22 include a further correction to temperature of  $-0.23^{\circ}\text{C}$  at all pressures. This is due to an offset in temperature on the analog traces for these casts.

Temperature and salinity values were listed at standard pressures and plotted using a Calcomp 565 Offline Plotter.

Data values which we suspect but which we have included in this data record are indicated with a plus. These data have been removed from magnetic tape records.

The headings for the data listings are explained as follows:

PRESS	is pressure (decibars)
TEMP	is temperature (degrees Celsius)
SAL	is salinity (parts per thousand)

DEPTH	is reported in metres
SIGMA-T	is specific gravity anomaly
SVA	is specific volume anomaly
THETA	is potential temperature (degrees Celsius)
SVA (THETA)	is potential specific volume anomaly
DELTA D	is geopotential anomaly (J/kg)
POT EN	is potential energy in units of $10^8$ ergs/cm <sup>2</sup>
SOUND	is the velocity of sound in metres per second

#### REFERENCES

Carpenter, J.H., 1965. The Chesapeake Bay Institute technique for the Winkler dissolved oxygen method. Limnol. and Oceangr. 10, 141-143.

Collins, C.A., R.L. Tripe, D.A. Healey and J. Joergensen, 1969. The time distribution of serial oceanographic data from the Ocean Station P programme. Fish. Res. Bd. Can. Tech. Rept. No. 106.

MacNeill, M., 1977. A study of anomalous salinity and oxygen values in the deep water at Ocean Station P from 1960-1976 (unpublished manuscript) Pacific Marine Science Report 77-9.

Reiniger, R.F. and C.K. Ross, 1968. A method of interpolation with application to oceanographic data. Deep Sea Res. 15, 185-193.

U.S.N. Hydrographic Office, 1955. Instruction Manual of Oceanographic Observations. Publ. No. 607.

LOG OF HYDROGRAPHIC AND STP OBSERVATIONS

Consec #	Station	Date (Z)	Time (Z)	STD (m)	Hydrocast	Comments
001	6	21/10/78	1445	1400		
002	7	21/10/78	1935	1400		
003	10	22/10/78	1550	1400		
004	P	23/10/78	1750	1400		
005	P	25/10/78	1545	1400		
006	P	26/10/78	1730	1400		
007	P	27/10/78	2155	1400		
008	P	28/10/78	1715	1400		
009	P	31/10/78	1845	1400		
010	P	03/11/78	1717	1400		
011	P	06/11/78	1715	1400		
012	P	08/11/78	1319	1400		
013	P	10/11/78	1720	1400		
014	P	11/11/78	1710	1400		
015	P	12/11/78	1823	1400		
016	P	13/11/78	2130	1400		
017	P	14/11/78	1715	1400		
018	P	15/11/78	1725	1400		
019	P	16/11/78	1715	1400		
020	P	17/11/78	1715	1400		
021	P	18/11/78	1745	1400		
022	P	19/11/78	1715	1400		
023	P	20/11/78	1318	1400		
024	P	21/11/78	1715	1400		
025	P	22/11/78	1725	1400		
026	P	23/11/78	1720	1400		
027	P	24/11/78	1730	1400		
028	P	25/11/78	1717	1400		
029	P	27/11/78	2135	1400		
030	P	28/11/78	1715	1400		
031	P	30/11/78	1712	1400		
032	P	01/12/78	1720	1400		
033	P	02/12/78	1715	1400		
034	12	03/12/78	1930	1400		
035	11	04/12/78	0400	1400		
036	10	04/12/78	0945	1400		
037	9	04/12/78	1650	1400		
038	8	04/12/78	2300	1400		
039	7	05/12/78	0420	1400		
040	6	05/12/78	1010	1400		
041	5	05/12/78	1630	1400		
042	4	05/12/78	2015	1400		

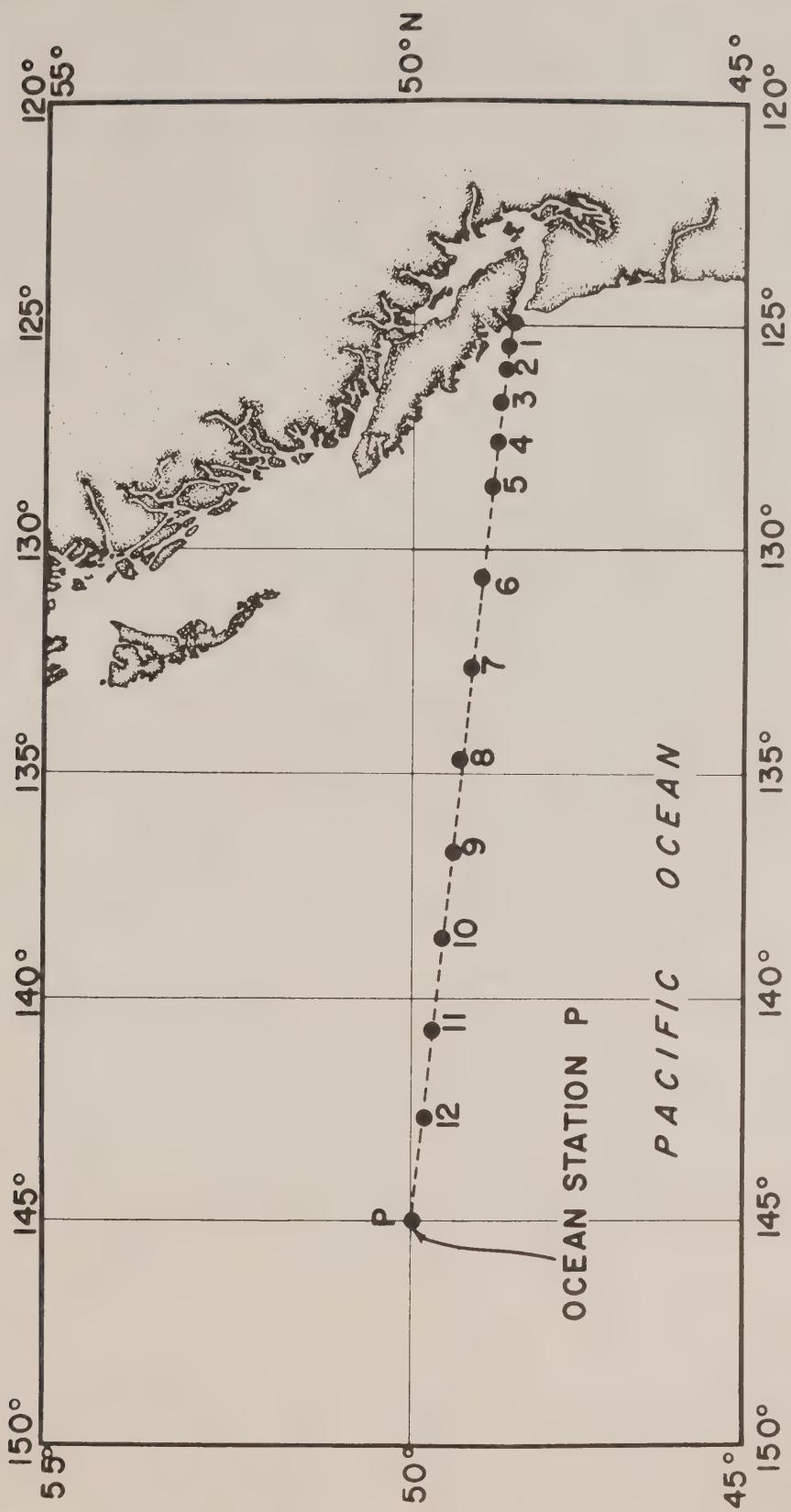


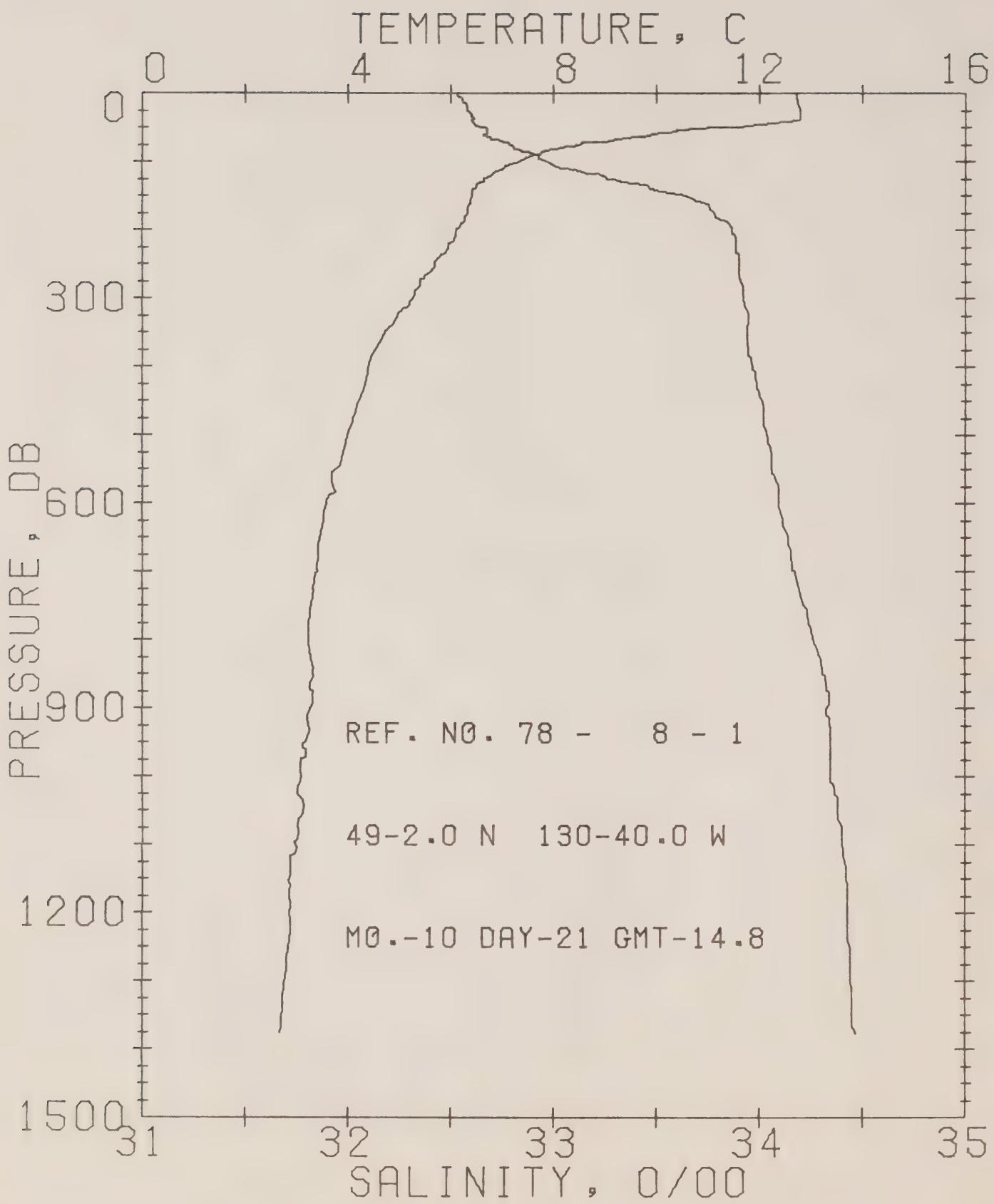
Fig. 1 Chart showing Line P station positions.



Oceanographic Data Obtained on Cruise P-78-8  
(MEDS Reference No. 15-78-008)



Results of STD Observations  
(P-78-8)



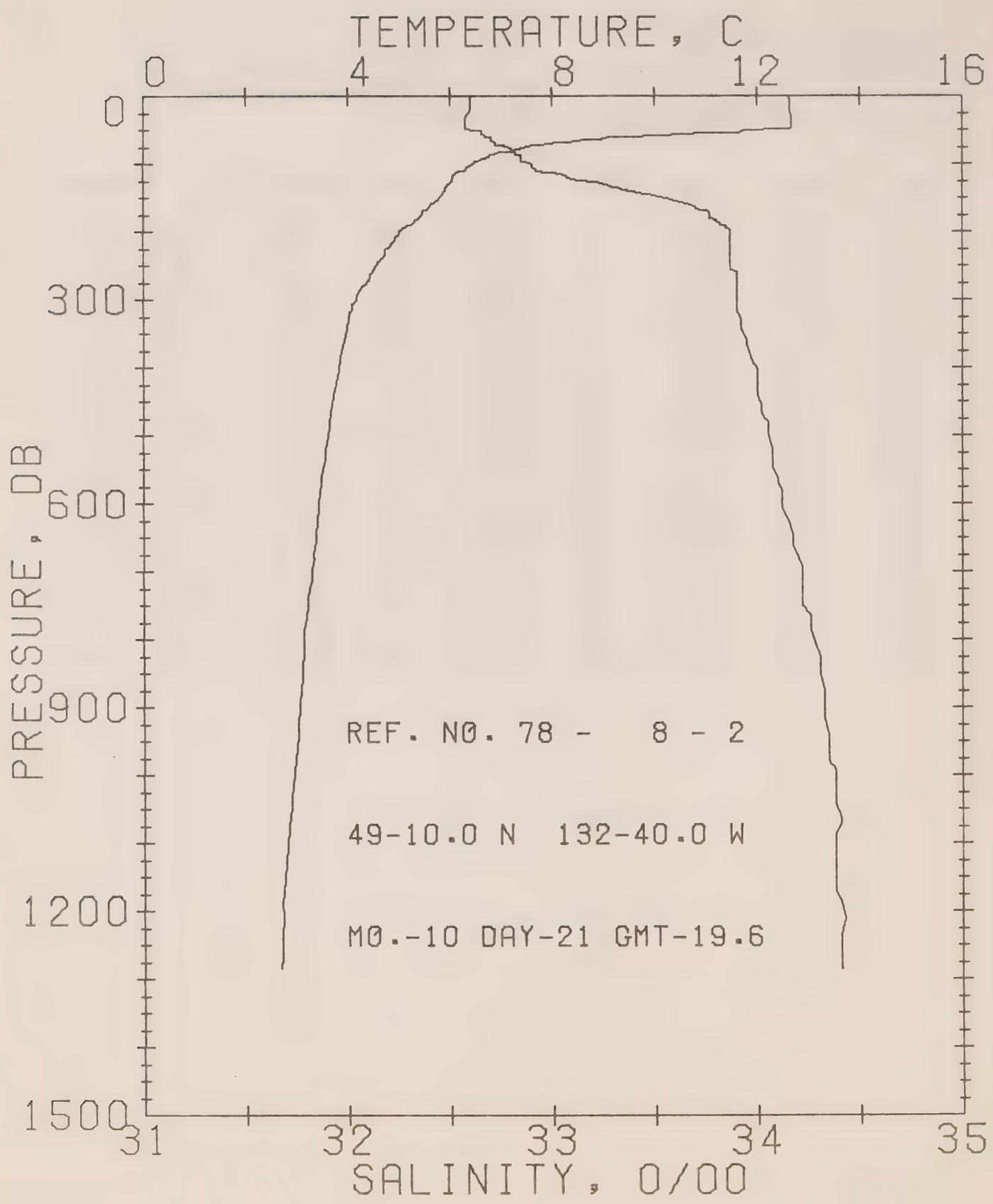
OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 1

DATE 21/10/78

POSITION 49- 2.0N, 130-40.0W GMT 14.8 STATION 6  
RESULTS OF STP CAST 338 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.71	32.53	0	24.56	338.5	.00	.00	1497.
10	12.75	32.55	10	24.57	338.0	.34	.02	1497.
20	12.77	32.58	20	24.59	336.4	.68	.07	1497.
30	12.80	32.59	30	24.59	336.4	1.01	.15	1498.
50	11.59	32.65	50	24.86	310.7	1.67	.42	1494.
75	8.46	32.79	75	25.50	250.8	2.36	.86	1483.
100	7.30	32.97	99	25.80	221.9	2.95	1.38	1479.
125	6.64	33.26	124	26.12	191.8	3.47	1.98	1477.
150	6.39	33.63	149	26.45	161.1	3.91	2.59	1477.
175	6.31	33.78	174	26.57	149.6	4.29	3.23	1478.
200	6.11	33.87	199	26.67	140.6	4.66	3.92	1477.
225	5.95	33.89	223	26.70	137.5	5.01	4.67	1477.
250	5.68	33.90	248	26.75	133.8	5.34	5.49	1476.
300	5.25	33.92	298	26.81	127.8	6.00	7.32	1476.
400	4.39	33.97	397	26.95	115.3	7.20	11.59	1474.
500	3.98	34.03	496	27.04	106.9	8.30	16.68	1474.
600	3.57	34.09	595	27.13	99.0	9.33	22.43	1474.
800	3.23	34.26	793	27.30	83.9	11.16	35.43	1476.
1000	3.09	34.35	991	27.38	77.3	12.75	50.02	1479.
1200	2.86	34.43	1188	27.47	70.1	14.21	66.32	1481.



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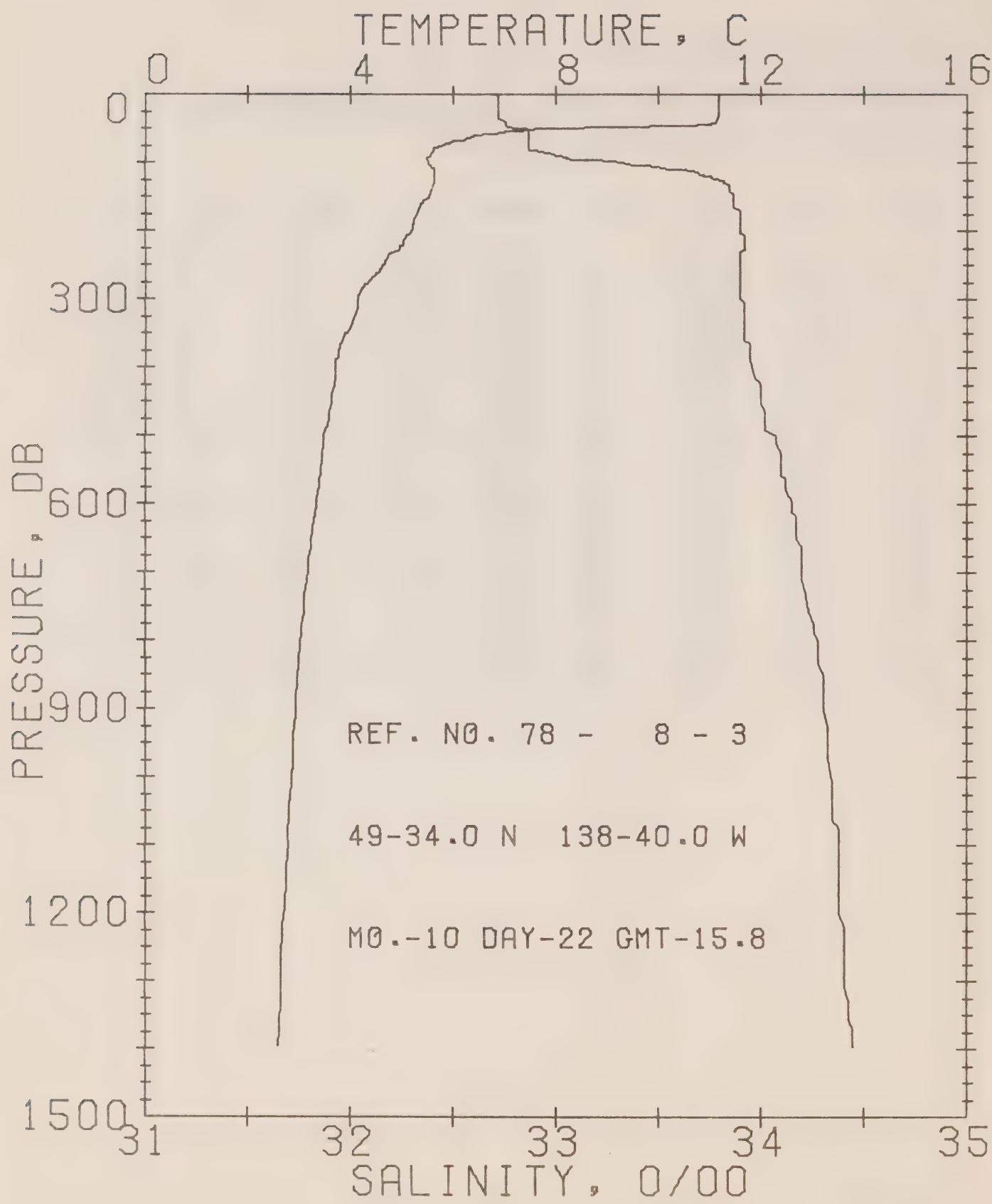
REFERENCE NO. 78- 8- 2 DATE 21/10/78

POSITION 49-10.0N, 132-40.0W GMT 19.6 STATION 7

RESULTS OF STP CAST 252 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	12.62	32.60	0	24.63	331.7	.00	.00	1497.
10	12.64	32.60	10	24.63	332.3	.33	.02	1497.
20	12.65	32.60	20	24.63	332.7	.66	.07	1497.
30	12.66	32.58	30	24.61	334.9	1.00	.15	1497.
50	11.82	32.62	50	24.80	316.9	1.67	.43	1495.
75	7.44	32.78	75	25.64	236.9	2.35	.85	1479.
100	6.44	32.90	99	25.86	215.8	2.91	1.36	1476.
125	6.03	33.17	124	26.13	190.9	3.42	1.94	1475.
150	5.77	33.55	149	26.46	160.1	3.86	2.56	1475.
175	5.43	33.77	174	26.67	139.7	4.23	3.17	1474.
200	4.99	33.87	199	26.80	127.4	4.57	3.81	1473.
225	4.73	33.87	223	26.83	124.7	4.88	4.49	1472.
250	4.53	33.87	248	26.86	122.8	5.19	5.24	1472.
300	4.15	33.90	298	26.92	116.9	5.79	6.91	1471.
400	3.82	33.99	397	27.03	107.2	6.91	10.91	1471.
500	3.60	34.05	496	27.09	101.6	7.96	15.71	1472.
600	3.42	34.12	595	27.17	95.2	8.94	21.21	1473.
800	3.12	34.27	793	27.32	81.8	10.70	33.74	1475.
1000	2.93	34.38	990	27.42	73.3	12.25	47.94	1478.
1200	2.71	34.42	1188	27.47	68.9	13.69	64.08	1480.



OFFSHORE OCEANOGRAPHY GROUP

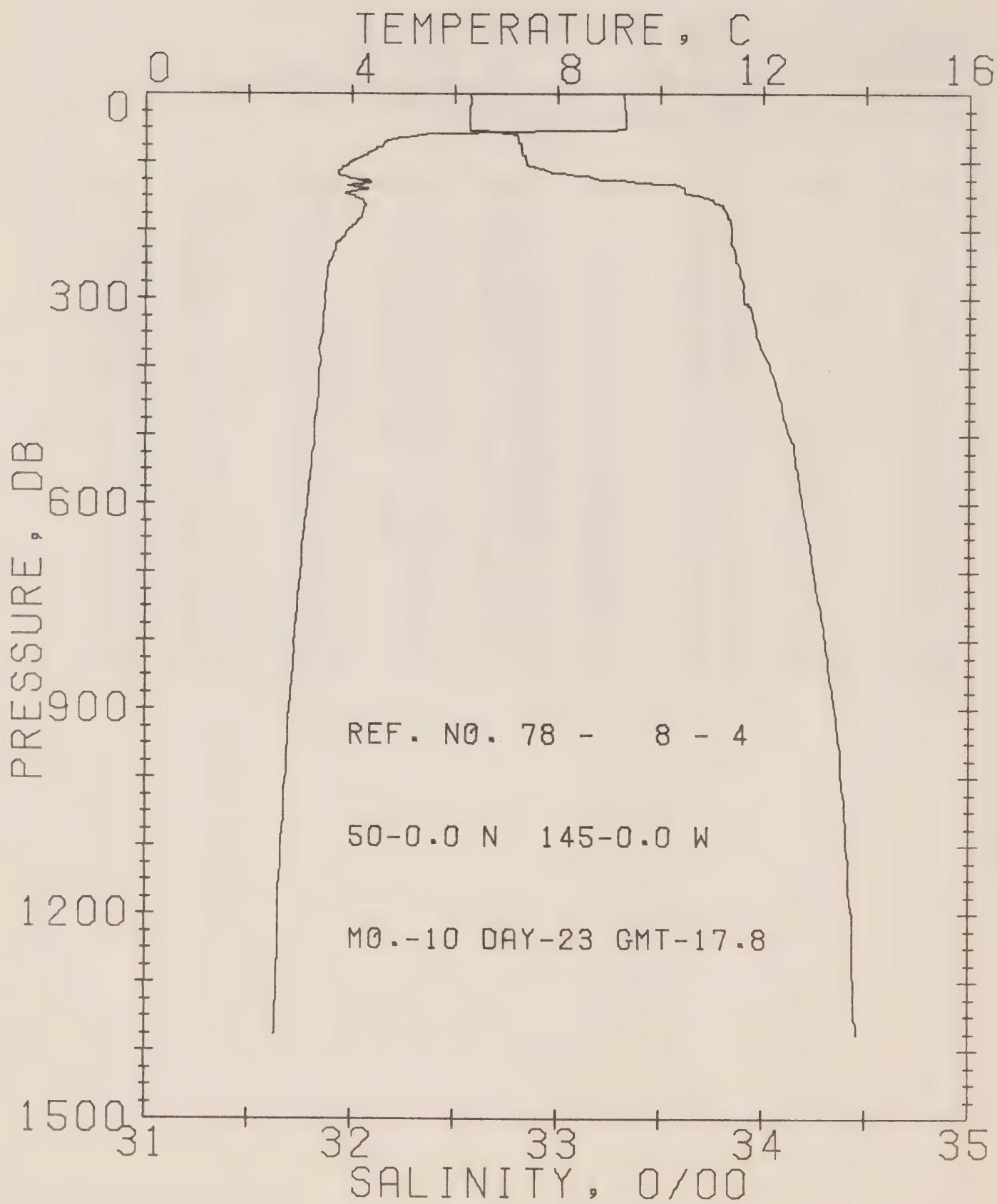
REFERENCE NO. 78- 8- 3 DATE 22/10/78

POSITION 49-34.0N, 138-40.0W GMT 15.8 STATION 10

RESULTS OF STP CAST 247 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	11.18	32.70	0	24.98	298.8	.00	.00	1492.
10	11.17	32.72	10	24.99	297.4	.30	.02	1492.
20	11.17	32.72	20	24.99	297.7	.59	.06	1492.
30	11.17	32.72	30	25.00	297.8	.89	.14	1492.
50	8.26	32.80	50	25.53	246.8	1.47	.37	1482.
75	5.75	32.87	75	25.93	209.5	2.02	.72	1472.
100	5.52	33.32	99	26.31	173.4	2.51	1.16	1473.
125	5.64	33.80	124	26.67	139.3	2.90	1.60	1474.
150	5.52	33.87	149	26.74	132.9	3.24	2.07	1474.
175	5.28	33.90	174	26.79	128.2	3.56	2.61	1474.
200	5.18	33.90	199	26.81	127.3	3.88	3.22	1474.
225	4.96	33.92	223	26.85	123.6	4.19	3.90	1473.
250	4.65	33.90	248	26.87	121.9	4.50	4.64	1472.
300	4.14	33.90	298	26.92	116.8	5.09	6.30	1471.
400	3.72	33.96	397	27.01	108.7	6.22	10.32	1471.
500	3.46	34.07	496	27.12	98.6	7.27	15.12	1471.
600	3.33	34.15	595	27.20	92.0	8.23	20.48	1473.
800	3.01	34.28	793	27.33	80.3	9.96	32.84	1475.
1000	2.85	34.35	990	27.40	75.0	11.52	47.06	1477.
1200	2.70	34.38	1188	27.44	71.8	12.98	63.42	1480.

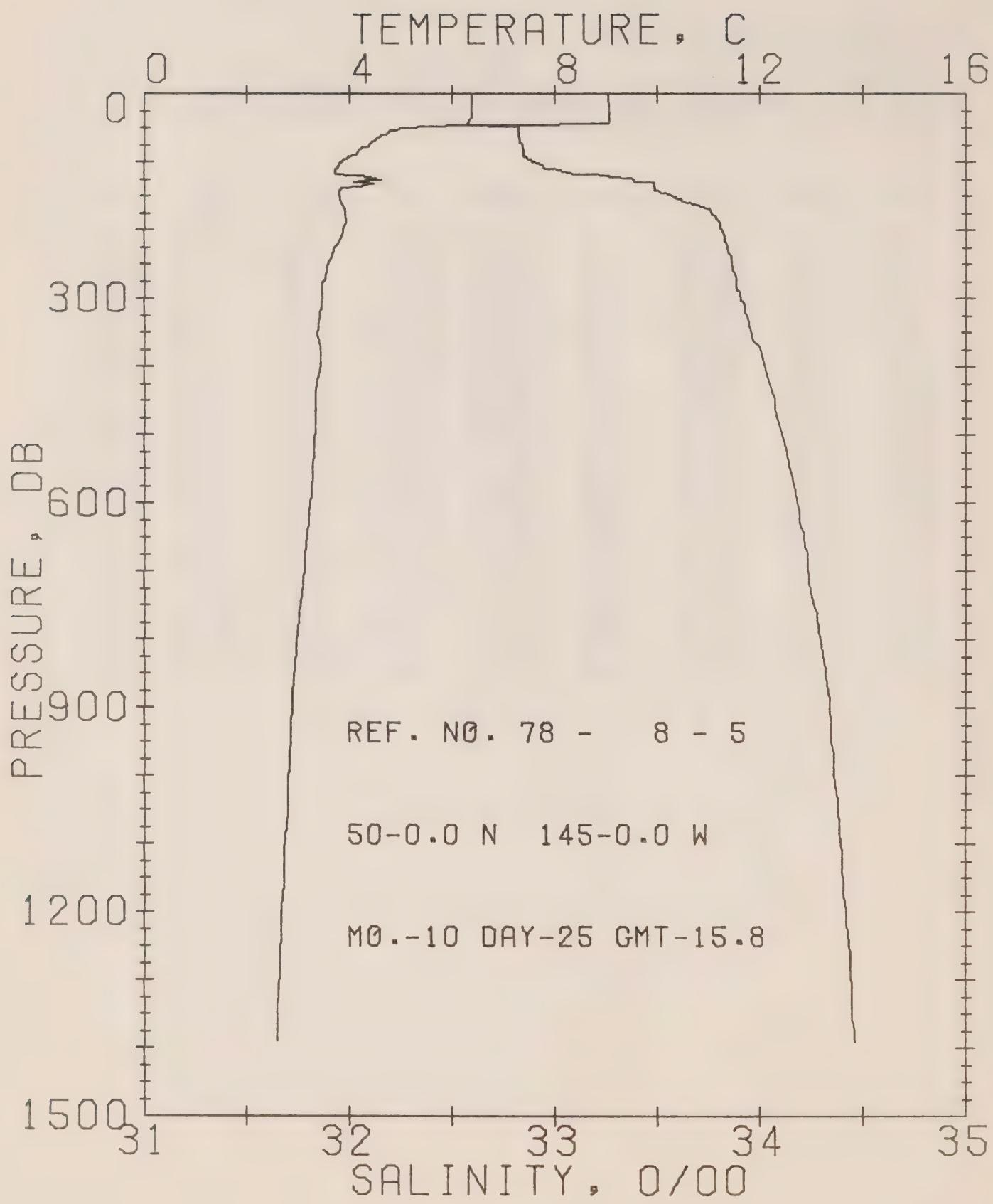


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REFERENCE NO. 78- 8- 4 DATE 23/10/78

POSITION 50- .0N, 145- .0W GMT 17.8 STATION P  
RESULTS OF STP CAST 247 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.29	32.57	0	25.20	278.1	.00	.00	1485.
10	9.30	32.58	10	25.20	277.7	.28	.01	1485.
20	9.30	32.57	20	25.19	278.6	.56	.06	1485.
30	9.32	32.57	30	25.19	279.1	.83	.13	1485.
50	9.33	32.57	50	25.19	279.5	1.39	.36	1486.
75	4.58	32.82	75	26.02	200.4	1.95	.70	1468.
100	3.96	32.85	99	26.11	192.2	2.44	1.14	1465.
125	4.18	33.22	124	26.38	166.7	2.89	1.66	1467.
150	4.07	33.69	149	26.77	130.2	3.25	2.16	1468.
175	4.21	33.82	174	26.85	122.1	3.56	2.68	1469.
200	3.90	33.85	199	26.91	117.3	3.86	3.25	1468.
225	3.69	33.86	223	26.93	115.0	4.15	3.88	1468.
250	3.56	33.88	248	26.96	112.1	4.43	4.56	1468.
300	3.48	33.91	298	26.99	109.4	4.99	6.11	1468.
400	3.38	34.03	397	27.10	100.1	6.03	9.83	1469.
500	3.28	34.13	496	27.19	92.5	6.99	14.23	1471.
600	3.15	34.19	595	27.25	87.2	7.89	19.23	1472.
800	2.89	34.31	793	27.37	76.9	9.52	30.89	1474.
1000	2.73	34.38	990	27.44	70.8	11.00	44.38	1477.
1200	2.59	34.44	1188	27.50	66.5	12.37	59.74	1480.



OFFSHORE OCEANOGRAPHY GROUP

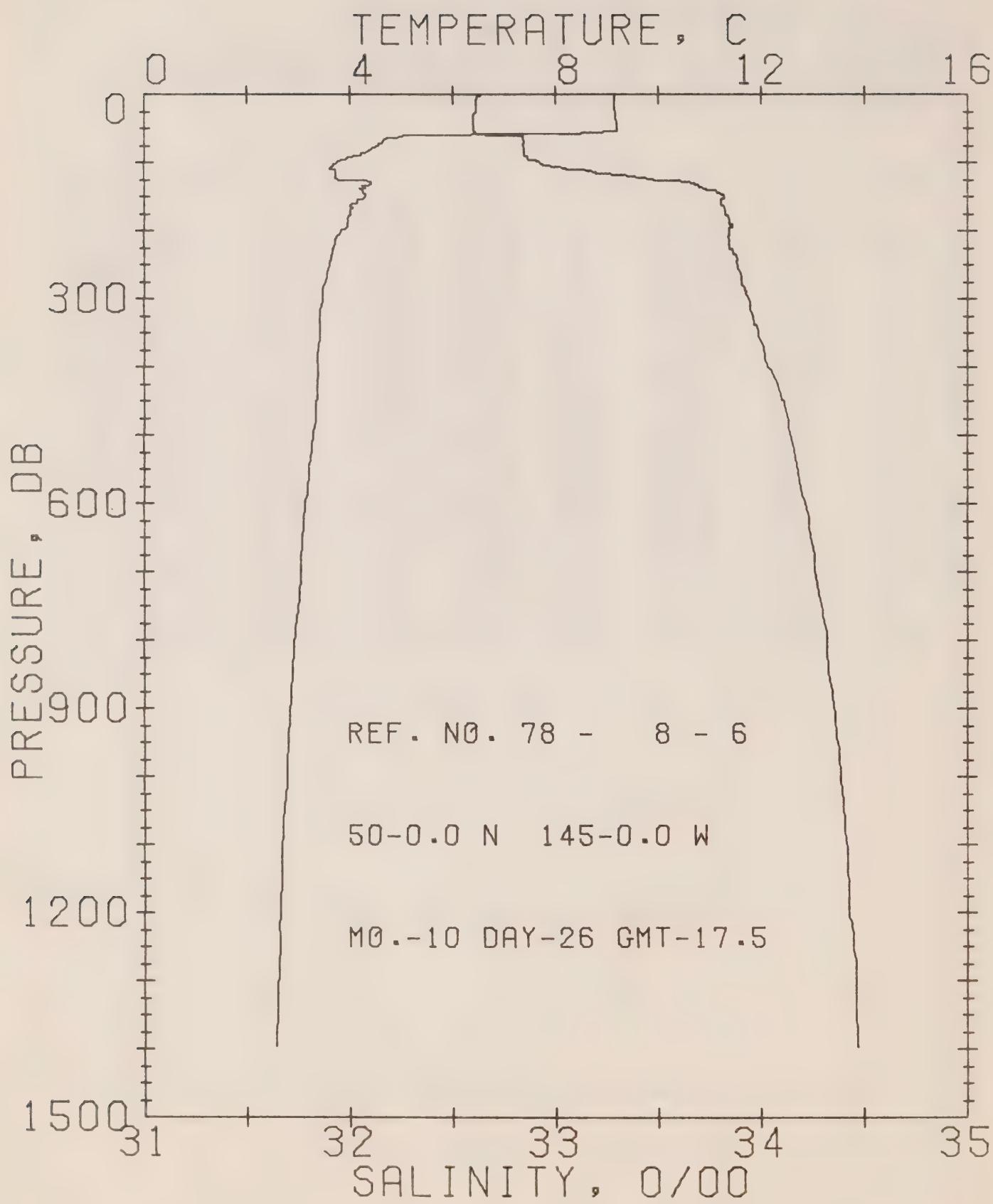
REFERENCE NO. 78- 8- 5 DATE 25/10/78

POSITION 50- .0N, 145- .0W GMT 15.8 STATION P

RESULTS OF STP CAST 221 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.03	32.59	0	25.25	272.7	.00	.00	1484.
10	9.05	32.59	10	25.25	273.2	.27	.01	1484.
20	9.06	32.59	20	25.25	273.5	.55	.06	1484.
30	9.07	32.59	30	25.25	273.8	.82	.13	1484.
50	5.20	32.82	50	25.95	206.8	1.35	.34	1470.
75	4.37	32.84	75	26.06	196.8	1.85	.66	1467.
100	3.81	32.89	99	26.15	187.7	2.33	1.09	1465.
125	4.62	33.39	124	26.47	158.5	2.77	1.59	1469.
150	3.80	33.57	149	26.69	137.1	3.13	2.10	1467.
175	3.93	33.76	174	26.83	123.9	3.46	2.63	1468.
200	3.87	33.81	199	26.88	119.8	3.76	3.21	1468.
225	3.70	33.84	223	26.92	116.2	4.06	3.85	1468.
250	3.57	33.86	248	26.95	113.7	4.34	4.55	1468.
300	3.47	33.91	298	27.00	109.2	4.90	6.10	1468.
400	3.42	34.02	397	27.09	101.1	5.95	9.84	1470.
500	3.32	34.11	496	27.16	94.6	6.92	14.31	1471.
600	3.22	34.18	595	27.23	88.7	7.84	19.44	1472.
800	2.97	34.30	793	27.35	78.6	9.51	31.36	1475.
1000	2.81	34.36	990	27.42	73.4	11.02	45.17	1477.
1200	2.68	34.42	1188	27.47	68.7	12.44	61.06	1480.



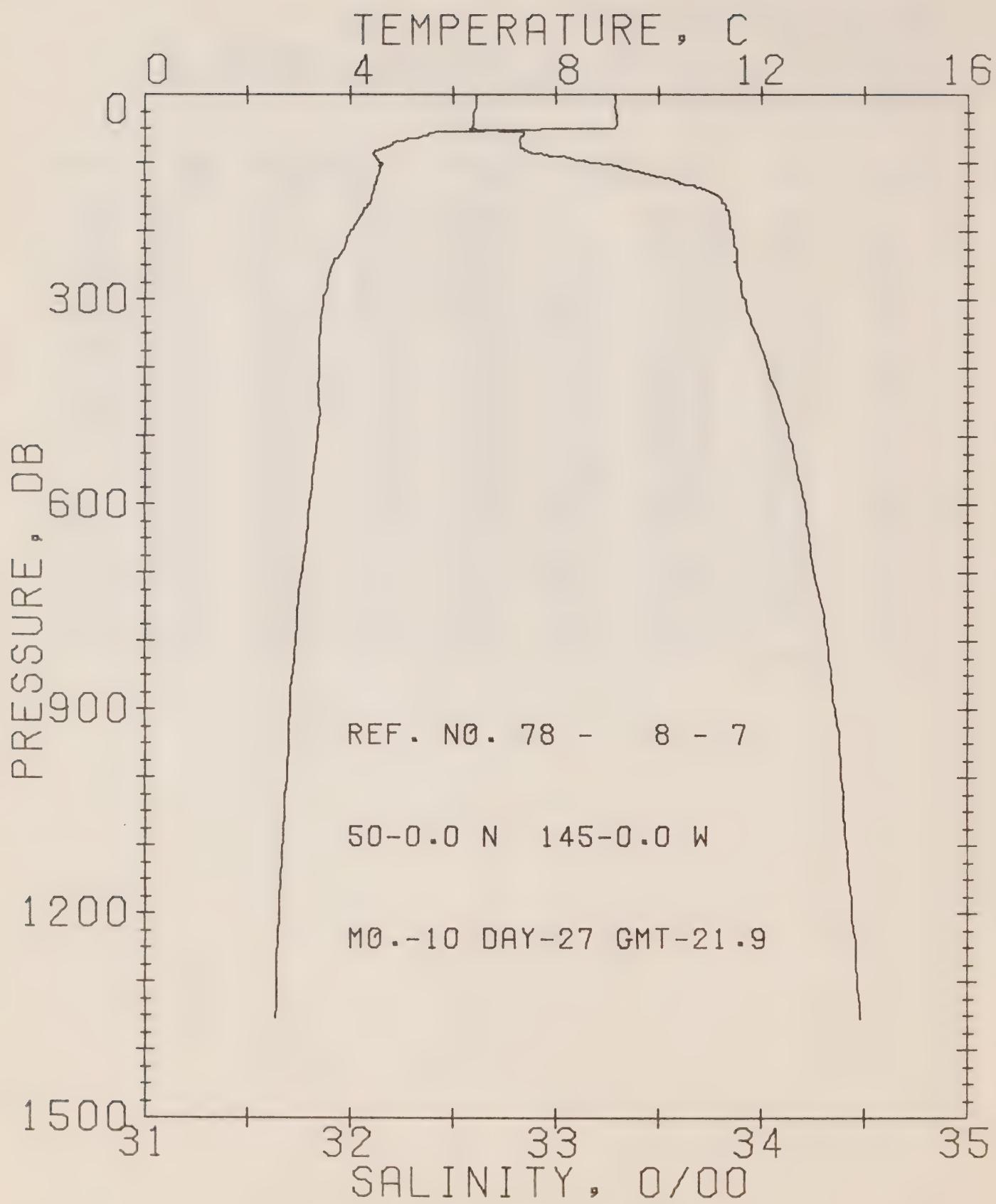
OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 6

DATE 26/10/78

POSITION 50- .0N, 145- .0W    GMT 17.5    STATION P  
 RESULTS OF STP CAST    243 POINTS TAKEN FROM ANALOG TRACE  
 GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.15	32.63	0	25.26	271.5	.00	.00	1484.
10	9.16	32.61	10	25.25	273.3	.27	.01	1484.
20	9.16	32.61	20	25.25	273.5	.55	.06	1485.
30	9.18	32.60	30	25.24	274.7	.82	.13	1485.
50	9.19	32.60	50	25.23	275.2	1.37	.35	1485.
75	4.52	32.84	75	26.04	198.3	1.93	.70	1467.
100	3.74	32.92	99	26.18	184.8	2.41	1.13	1465.
125	3.82	33.48	124	26.62	143.7	2.83	1.61	1460.
150	4.30	33.82	149	26.84	123.2	3.16	2.06	1469.
175	4.02	33.83	174	26.88	119.8	3.46	2.56	1468.
200	3.82	33.85	199	26.91	116.5	3.75	3.13	1468.
225	3.67	33.85	223	26.93	115.2	4.04	3.75	1468.
250	3.60	33.89	248	26.97	111.7	4.33	4.44	1468.
300	3.46	33.94	298	27.02	106.9	4.87	5.97	1468.
400	3.38	34.03	397	27.10	99.9	5.90	9.65	1469.
500	3.27	34.14	496	27.20	91.2	6.85	13.99	1471.
600	3.12	34.21	595	27.27	85.2	7.74	18.95	1472.
800	2.93	34.32	793	27.37	76.5	9.35	30.45	1474.
1000	2.78	34.39	990	27.44	70.9	10.83	43.94	1477.
1200	2.63	34.43	1188	27.49	67.5	12.20	59.36	1480.



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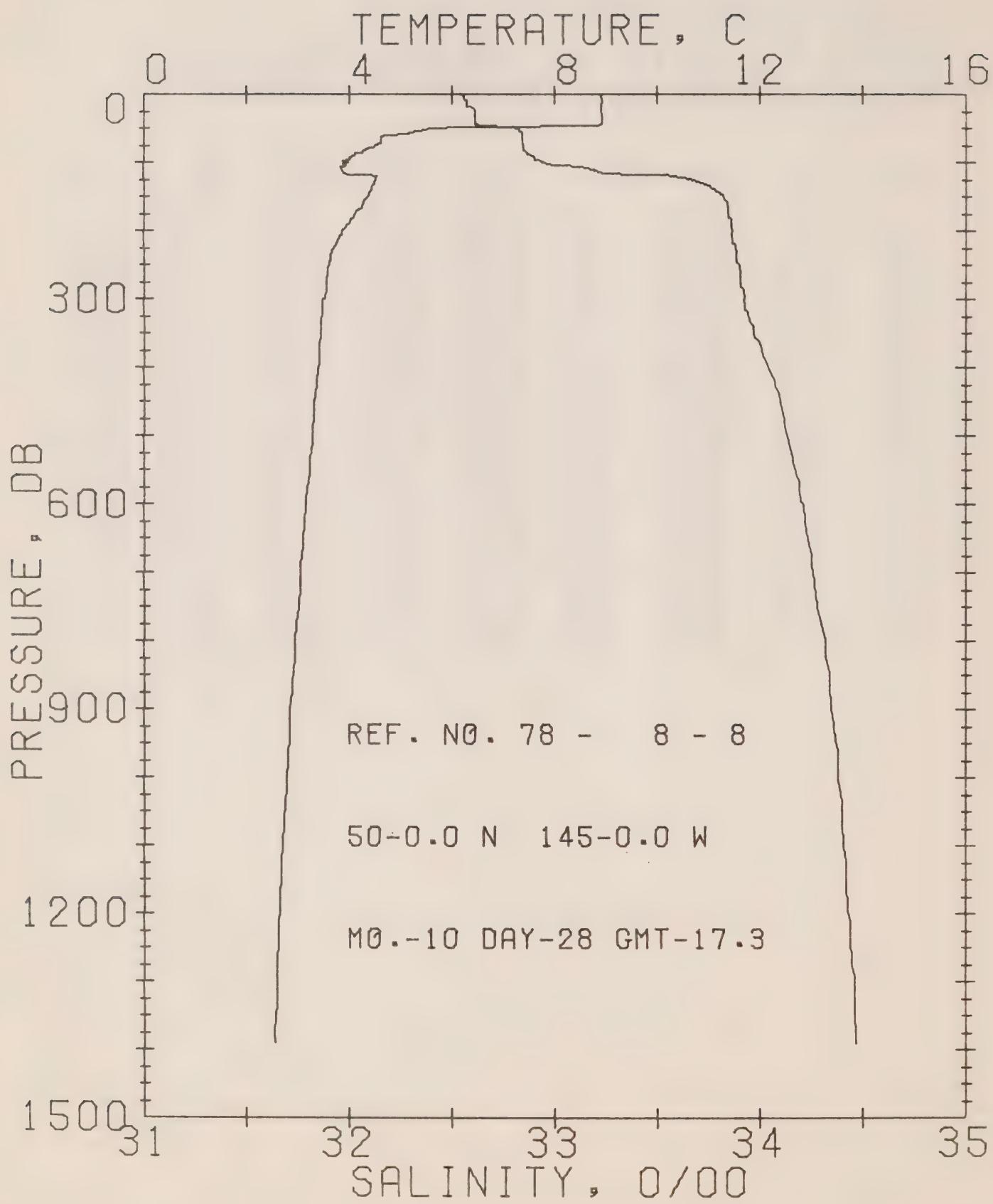
REFERENCE NO. 78- 8- 7 DATE 27/10/78

POSITION 50- .0N, 145- .0W GMT 21.9 STATION P

RESULTS OF STP CAST 227 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.15	32.62	0	25.26	272.3	.00	.00	1484.
10	9.17	32.61	10	25.25	273.5	.27	.01	1484.
20	9.16	32.61	20	25.24	273.7	.55	.06	1485.
30	9.19	32.60	30	25.24	274.8	.82	.13	1485.
50	9.16	32.59	50	25.23	275.5	1.37	.35	1485.
75	4.75	32.83	75	26.01	201.4	1.90	.68	1468.
100	4.62	33.18	99	26.30	174.0	2.37	1.11	1469.
125	4.51	33.57	124	26.62	143.9	2.77	1.56	1469.
150	4.41	33.79	149	26.81	126.3	3.10	2.02	1469.
175	4.21	33.84	174	26.87	121.0	3.41	2.53	1469.
200	4.00	33.86	199	26.90	117.5	3.71	3.10	1469.
225	3.87	33.88	223	26.93	114.9	4.00	3.73	1468.
250	3.63	33.88	248	26.96	112.8	4.28	4.42	1468.
300	3.47	33.92	298	27.01	108.1	4.84	5.97	1468.
400	3.38	34.03	397	27.10	100.4	5.88	9.69	1469.
500	3.35	34.13	496	27.18	92.9	6.84	14.10	1471.
600	3.20	34.21	595	27.26	86.1	7.74	19.11	1472.
800	2.93	34.32	793	27.37	76.4	9.37	30.70	1474.
1000	2.77	34.39	990	27.44	70.8	10.83	44.10	1477.
1200	2.61	34.44	1188	27.49	66.6	12.20	59.45	1480.



OFFSHORE OCEANOGRAPHY GROUP

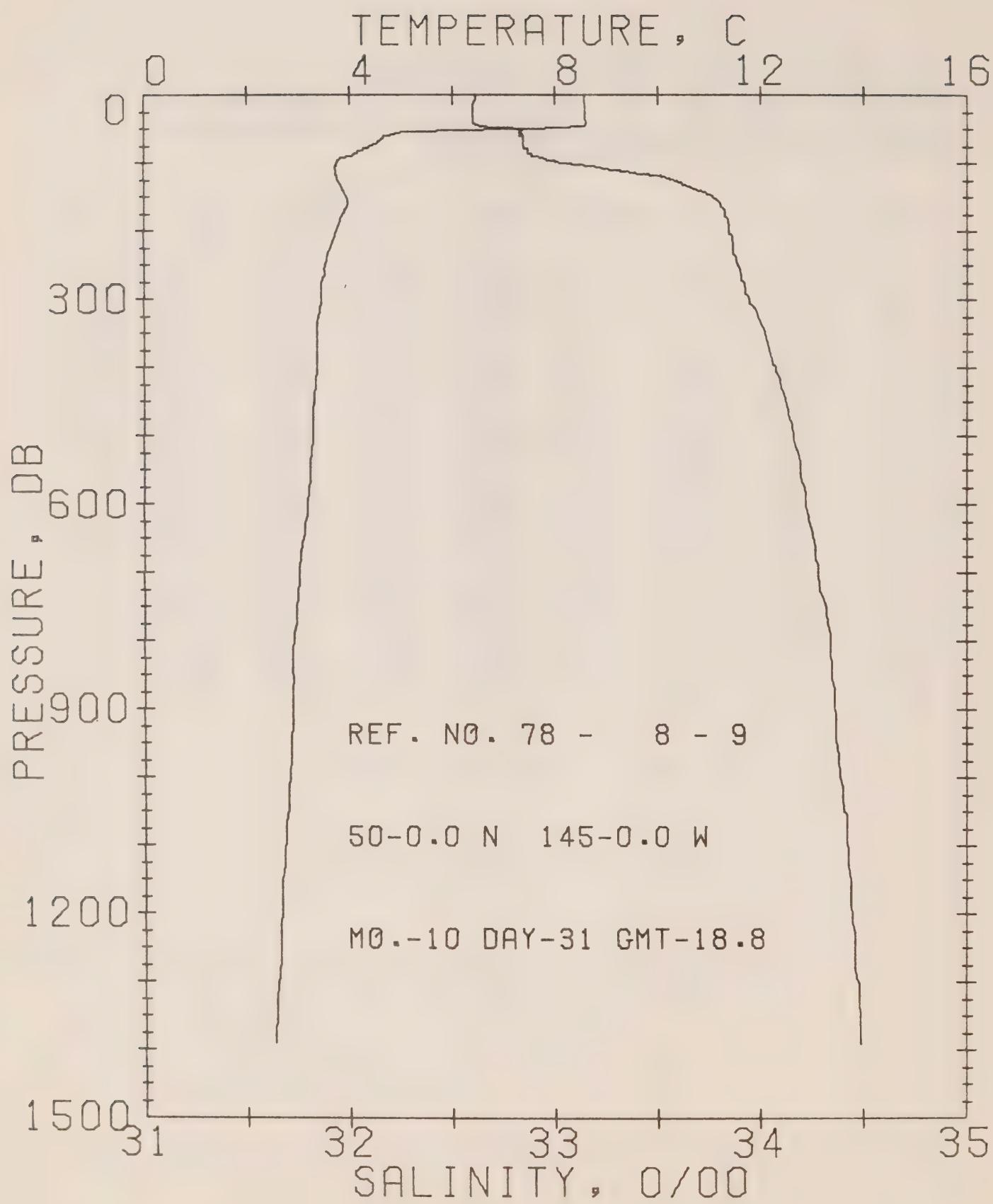
REFERENCE NO. 78- 8- 8 DATE 28/10/78

POSITION 50- .0N, 145- .0W GMT 17.3 STATION P

RESULTS OF STP CAST 254 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.92	32.54	0	25.23	274.8	.00	.00	1483.
10	8.93	32.57	10	25.25	272.9	.27	.01	1483.
20	8.91	32.60	20	25.28	270.5	.55	.06	1484.
30	8.93	32.61	30	25.28	270.2	.82	.12	1484.
50	5.69	32.82	50	25.89	212.2	1.34	.34	1472.
75	4.49	32.85	75	26.05	197.2	1.85	.66	1467.
100	3.92	32.94	99	26.18	185.0	2.33	1.09	1465.
125	4.50	33.66	124	26.69	137.1	2.73	1.55	1469.
150	4.34	33.82	149	26.84	123.6	3.06	2.00	1469.
175	4.09	33.85	174	26.89	119.0	3.36	2.50	1469.
200	3.87	33.87	199	26.92	115.5	3.65	3.06	1468.
225	3.69	33.88	223	26.95	113.1	3.94	3.68	1468.
250	3.59	33.90	248	26.97	111.0	4.22	4.36	1468.
300	3.50	33.93	298	27.01	108.1	4.77	5.90	1468.
400	3.39	34.04	397	27.10	99.7	5.81	9.61	1470.
500	3.27	34.13	496	27.19	92.3	6.76	13.98	1471.
600	3.14	34.21	595	27.26	85.8	7.65	18.96	1472.
800	2.94	34.32	793	27.37	76.6	9.28	30.57	1475.
1000	2.78	34.38	990	27.43	71.7	10.76	44.11	1477.
1200	2.63	34.43	1188	27.49	67.2	12.15	59.61	1480.



OFFSHORE OCEANOGRAPHY GROUP

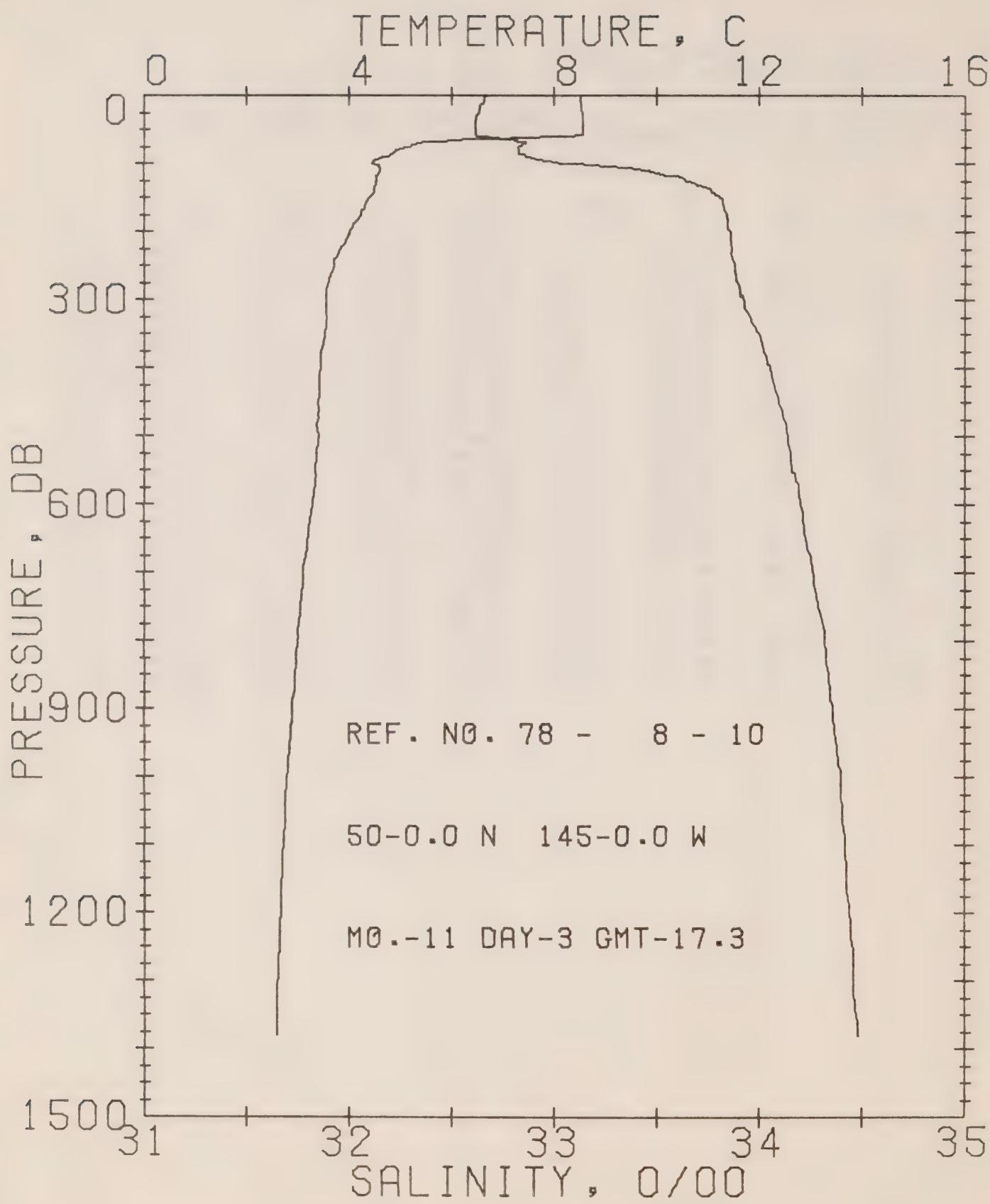
REFERENCE NO. 78- 8- 9 DATE 31/10/78

POSITION 50- .0N, 145- .0W GMT 18.8 STATION P

RESULTS OF STP CAST 250 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.57	32.61	0	25.34	264.5	.00	.00	1482.
10	8.58	32.61	10	25.33	265.1	.26	.01	1482.
20	8.58	32.60	20	25.33	265.7	.53	.05	1482.
30	8.60	32.60	30	25.33	266.1	.80	.12	1483.
50	7.60	32.83	50	25.65	235.4	1.32	.34	1479.
75	4.38	32.85	75	26.06	196.1	1.83	.66	1467.
100	3.73	33.07	99	26.30	173.5	2.30	1.08	1465.
125	3.79	33.59	124	26.71	135.1	2.68	1.51	1466.
150	3.96	33.77	149	26.84	123.5	3.01	1.97	1467.
175	3.86	33.83	174	26.89	118.2	3.31	2.46	1468.
200	3.73	33.85	199	26.92	115.6	3.60	3.02	1467.
225	3.61	33.87	223	26.95	113.1	3.88	3.64	1467.
250	3.52	33.89	248	26.97	110.9	4.16	4.32	1467.
300	3.43	33.95	298	27.03	106.1	4.71	5.84	1468.
400	3.36	34.07	397	27.13	96.9	5.72	9.43	1469.
500	3.27	34.16	496	27.21	90.0	6.65	13.70	1471.
600	3.17	34.22	595	27.27	85.2	7.52	18.60	1472.
800	2.91	34.34	793	27.39	74.8	9.12	29.93	1474.
1000	2.83	34.39	990	27.44	71.5	10.58	43.38	1477.
1200	2.66	34.45	1188	27.50	66.5	11.95	58.74	1480.



OFFSHORE OCEANOGRAPHY GROUP

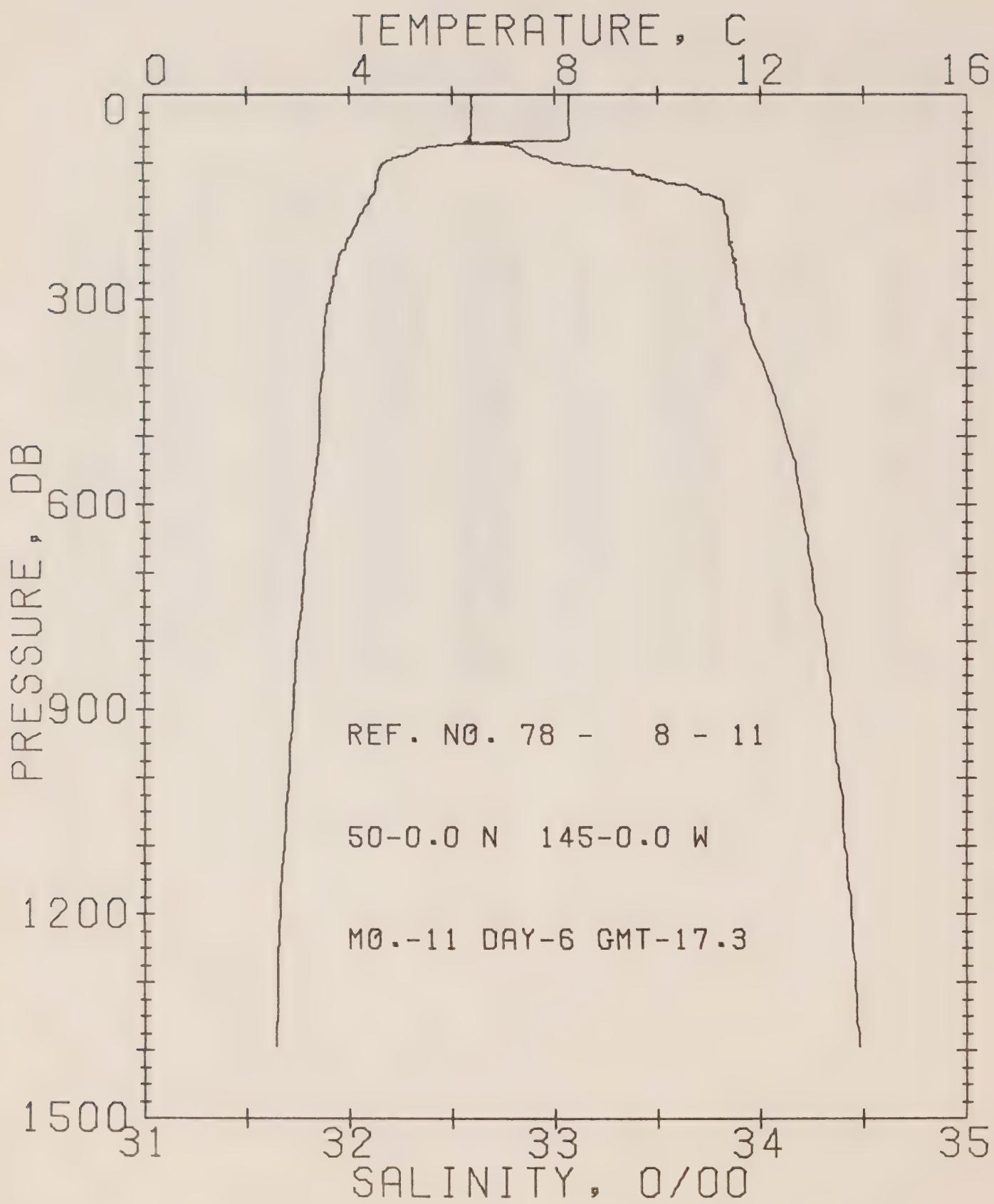
REFERENCE NO. 78- 8- 10 DATE 3/11/78

POSITION 50- .0N, 145- .0W GMT 17.3 STATION P

RESULTS OF STP CAST 253 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.51	32.67	0	25.39	259.2	.00	.00	1482.
10	8.53	32.65	10	25.38	261.0	.26	.01	1482.
20	8.54	32.63	20	25.36	262.8	.52	.05	1482.
30	8.55	32.62	30	25.35	263.8	.79	.12	1482.
50	8.56	32.61	50	25.34	265.2	1.31	.34	1483.
75	5.15	32.83	75	25.96	205.7	1.91	.71	1470.
100	4.48	33.11	99	26.26	177.8	2.40	1.15	1468.
125	4.53	33.64	124	26.67	138.8	2.78	1.59	1469.
150	4.38	33.81	149	26.82	124.8	3.11	2.04	1469.
175	4.21	33.84	174	26.87	121.0	3.42	2.55	1469.
200	4.00	33.86	199	26.90	117.5	3.72	3.12	1469.
225	3.83	33.87	223	26.93	115.3	4.01	3.75	1468.
250	3.70	33.88	248	26.95	113.4	4.29	4.45	1468.
300	3.56	33.93	298	27.00	108.6	4.85	6.01	1468.
400	3.44	34.05	397	27.11	99.1	5.89	9.71	1470.
500	3.40	34.14	496	27.19	92.7	6.85	14.10	1471.
600	3.28	34.20	595	27.24	87.7	7.76	19.17	1473.
800	2.99	34.32	793	27.37	77.2	9.40	30.86	1475.
1000	2.78	34.40	990	27.45	70.2	10.87	44.37	1477.
1200	2.67	34.44	1188	27.49	67.0	12.25	59.75	1480.

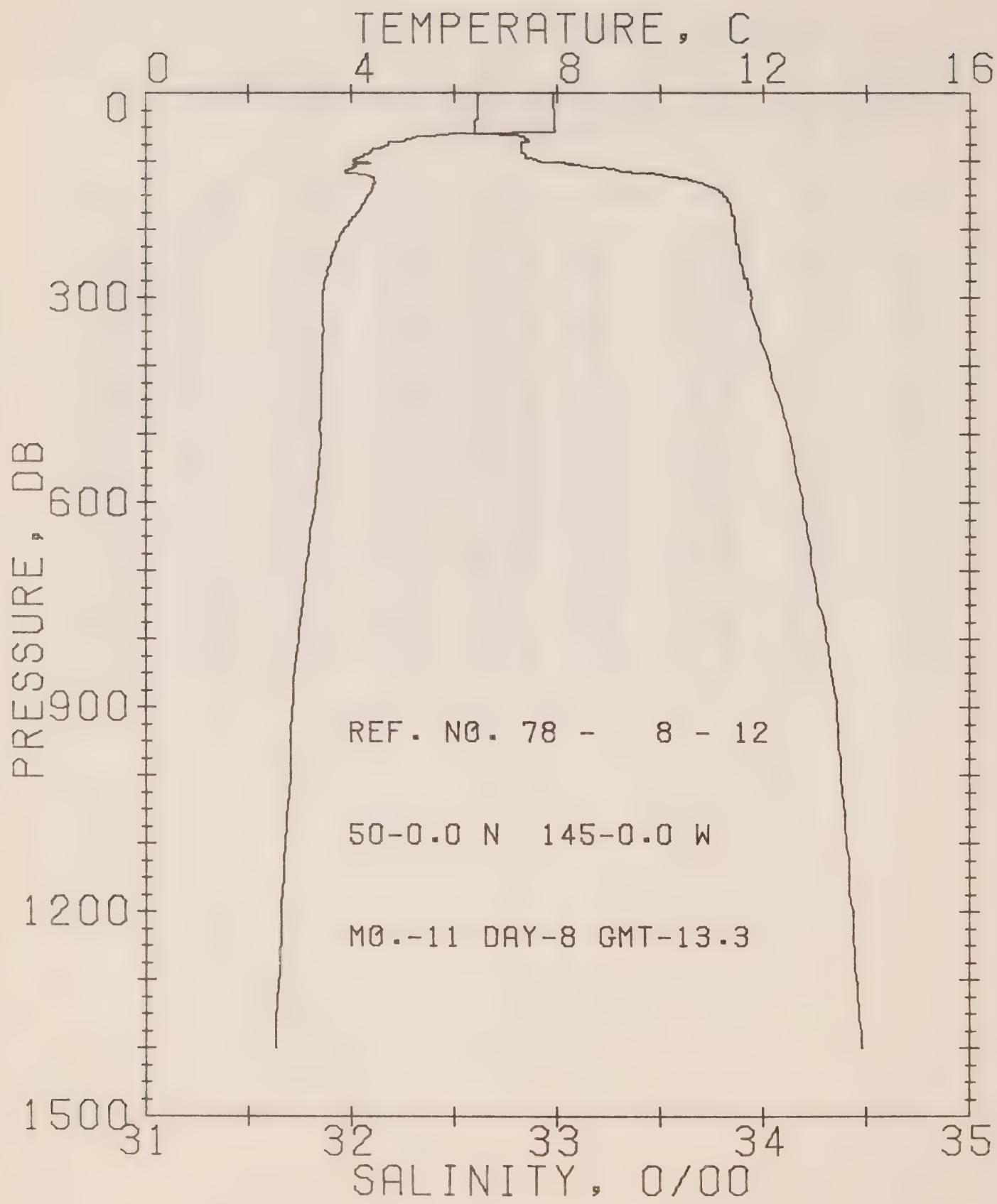


## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 11 DATE 6/11/78

POSITION 50- .0N, 145- .0W GMT 17.3 STATION P  
RESULTS OF STP CAST 244 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.26	32.60	0	25.38	260.8	.00	.00	1481.
10	8.28	32.59	10	25.37	261.9	.26	.01	1481.
20	8.27	32.60	20	25.37	261.4	.52	.05	1481.
30	8.27	32.59	30	25.37	262.2	.79	.12	1481.
50	8.29	32.59	50	25.36	262.7	1.31	.33	1482.
75	5.62	32.79	75	25.88	213.9	1.95	.74	1472.
100	4.66	33.01	99	26.16	187.2	2.45	1.18	1469.
125	4.54	33.50	124	26.56	149.4	2.86	1.65	1469.
150	4.41	33.78	149	26.80	127.3	3.20	2.13	1469.
175	4.21	33.83	174	26.86	121.6	3.51	2.64	1469.
200	4.06	33.85	199	26.89	118.9	3.81	3.22	1469.
225	3.91	33.86	223	26.91	116.8	4.11	3.86	1469.
250	3.75	33.88	248	26.94	113.9	4.39	4.55	1468.
300	3.61	33.91	298	26.98	110.7	4.96	6.13	1469.
400	3.49	34.01	397	27.08	102.4	6.02	9.93	1470.
500	3.40	34.12	496	27.17	94.0	7.00	14.41	1471.
600	3.25	34.20	595	27.25	87.5	7.91	19.47	1472.
800	2.98	34.32	793	27.36	77.3	9.56	31.24	1475.
1000	2.80	34.38	990	27.43	71.9	11.05	44.89	1477.
1200	2.63	34.44	1188	27.49	66.7	12.43	60.36	1480.



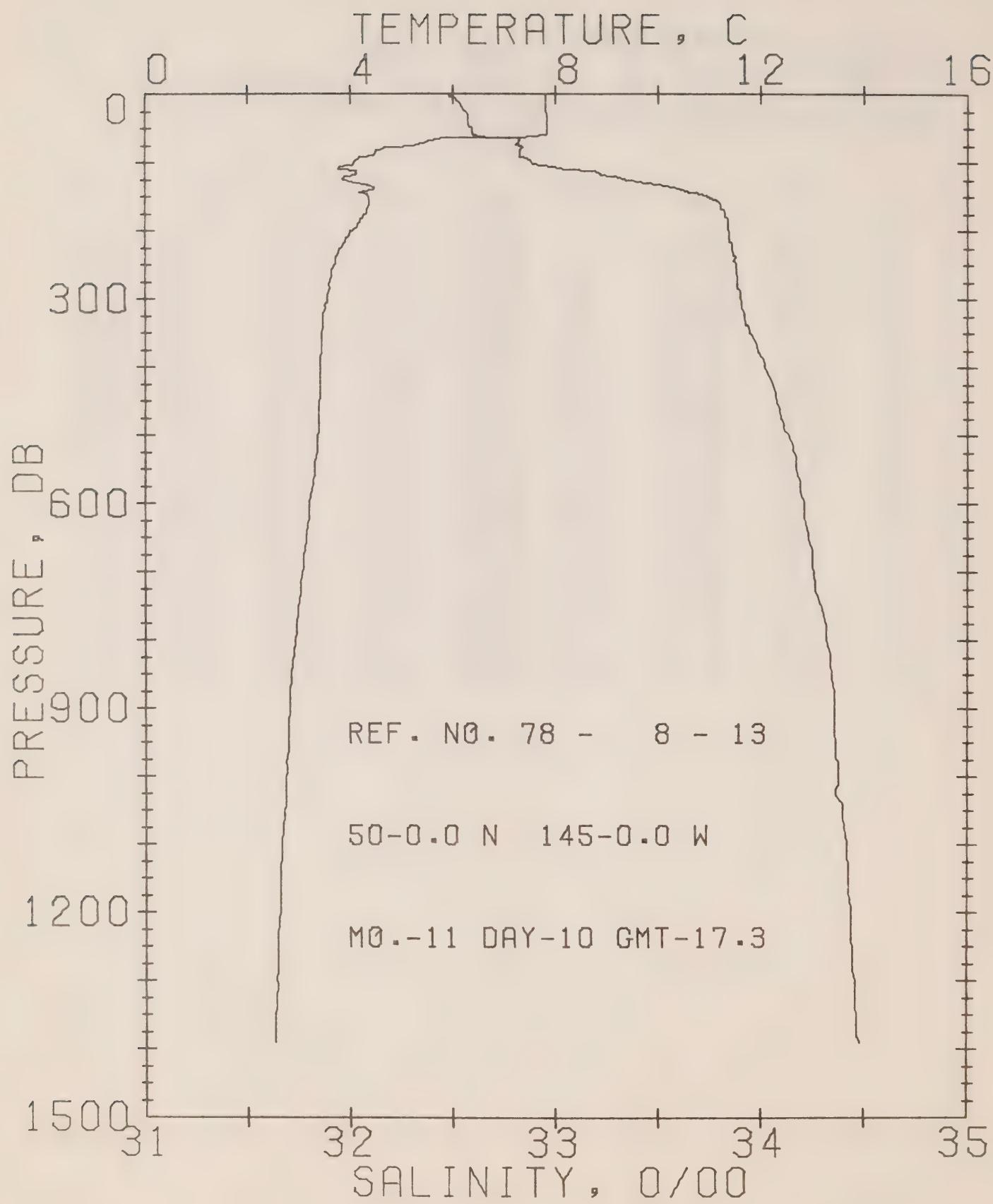
OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 12

DATE 8/11/78

POSITION 50- .0N, 145- .0W GMT 13.3 STATION P  
RESULTS OF STP CAST 236 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED. PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.91	32.61	0	25.44	255.2	.00	.00	1479.
10	7.92	32.61	10	25.43	255.5	.26	.01	1480.
20	7.93	32.61	20	25.43	255.8	.51	.05	1480.
30	7.95	32.61	30	25.43	256.2	.77	.12	1480.
50	7.96	32.60	50	25.42	257.4	1.28	.33	1480.
75	4.71	32.83	75	26.01	201.0	1.85	.68	1468.
100	4.02	32.91	99	26.15	188.3	2.34	1.12	1466.
125	4.46	33.59	124	26.64	141.9	2.74	1.58	1469.
150	4.32	33.81	149	26.83	124.1	3.07	2.04	1469.
175	4.12	33.85	174	26.88	119.3	3.38	2.55	1469.
200	3.85	33.86	199	26.92	116.0	3.67	3.11	1468.
225	3.69	33.88	223	26.95	113.2	3.96	3.73	1468.
250	3.59	33.89	248	26.97	111.6	4.24	4.41	1468.
300	3.43	33.95	298	27.03	105.9	4.78	5.93	1468.
400	3.43	34.03	397	27.09	100.6	5.82	9.64	1470.
500	3.39	34.12	496	27.17	94.0	6.79	14.10	1471.
600	3.30	34.19	595	27.23	88.8	7.71	19.22	1473.
800	2.98	34.31	793	27.36	77.8	9.38	31.08	1475.
1000	2.82	34.38	990	27.43	72.1	10.86	44.65	1477.
1200	2.64	34.44	1188	27.49	66.9	12.25	60.23	1480.



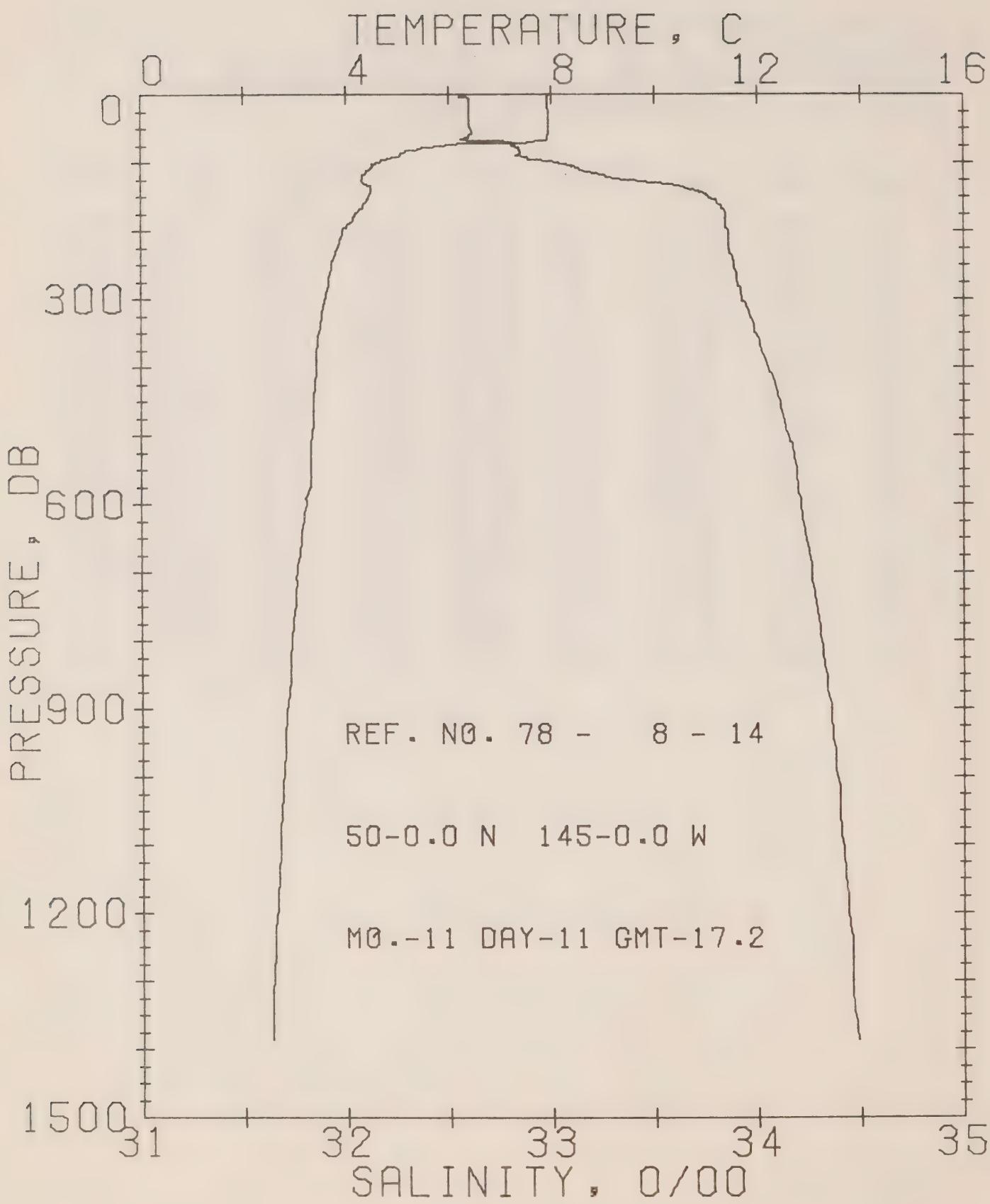
OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 13 DATE 10/11/78

POSITION 50- .0N, 145- .0W GMT 17.3 STATION P

RESULTS OF STP CAST 251 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.79	32.48	0	25.35	263.3	.00	.00	1479.
10	7.82	32.52	10	25.38	260.8	.26	.01	1479.
20	7.82	32.54	20	25.40	259.1	.52	.05	1479.
30	7.83	32.57	30	25.42	257.5	.78	.12	1480.
50	7.84	32.59	50	25.43	256.5	1.30	.33	1480.
75	5.20	32.82	75	25.95	207.0	1.88	.70	1470.
100	4.06	32.89	99	26.12	190.4	2.38	1.14	1466.
125	3.88	33.34	124	26.50	154.8	2.81	1.63	1466.
150	4.36	33.74	149	26.77	129.8	3.16	2.12	1469.
175	4.29	33.83	174	26.85	122.5	3.47	2.64	1469.
200	4.03	33.85	199	26.89	118.8	3.78	3.22	1469.
225	3.80	33.86	223	26.92	115.7	4.07	3.85	1468.
250	3.68	33.88	248	26.95	113.2	4.35	4.55	1468.
300	3.54	33.90	298	26.98	110.5	4.91	6.11	1468.
400	3.40	34.02	397	27.09	101.1	5.97	9.89	1470.
500	3.37	34.14	496	27.19	92.5	6.94	14.33	1471.
600	3.21	34.21	595	27.26	86.3	7.84	19.34	1472.
800	2.93	34.32	793	27.37	76.6	9.47	30.95	1474.
1000	2.76	34.38	990	27.43	71.5	10.94	44.38	1477.
1200	2.63	34.44	1188	27.49	66.8	12.31	59.80	1480.



OFFSHORE OCEANOGRAPHY GROUP

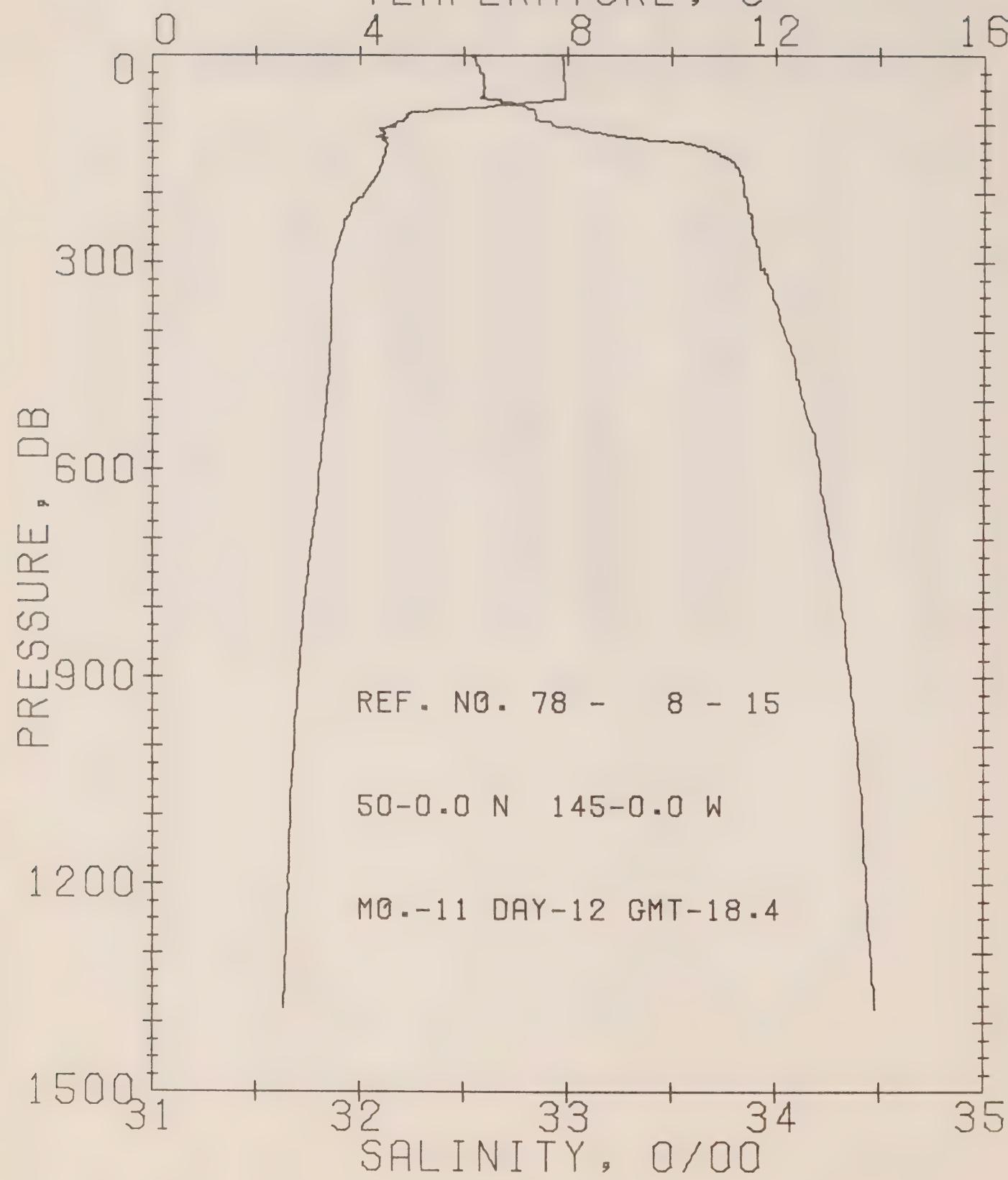
REFERENCE NO. 78- 8- 14

DATE 11/11/78

POSITION 50- .0N, 145- .0W GMT 17.2 STATION P  
RESULTS OF STP CAST 262 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.96	32.55	0	25.38	260.4	.00	.00	1480.
10	7.93	32.60	10	25.43	256.4	.26	.01	1480.
20	7.93	32.60	20	25.42	256.5	.51	.05	1480.
30	7.94	32.60	30	25.42	256.9	.77	.12	1480.
50	7.95	32.60	50	25.43	257.0	1.29	.33	1480.
75	5.85	32.81	75	25.87	215.1	1.91	.72	1473.
100	4.59	33.03	99	26.18	185.0	2.42	1.17	1468.
125	4.31	33.34	124	26.46	159.4	2.85	1.67	1468.
150	4.44	33.76	149	26.78	128.8	3.20	2.16	1469.
175	4.17	33.85	174	26.88	119.8	3.51	2.67	1469.
200	3.93	33.86	199	26.91	116.8	3.80	3.24	1468.
225	3.83	33.86	223	26.92	116.1	4.09	3.87	1468.
250	3.71	33.89	248	26.96	112.8	4.38	4.56	1468.
300	3.58	33.93	298	27.00	108.9	4.94	6.11	1469.
400	3.41	34.05	397	27.11	98.9	5.97	9.79	1470.
500	3.34	34.15	496	27.20	91.4	6.92	14.13	1471.
600	3.23	34.21	595	27.26	86.5	7.80	19.10	1472.
800	2.93	34.31	793	27.37	76.9	9.43	30.66	1474.
1000	2.77	34.39	990	27.44	71.0	10.90	44.18	1477.
1200	2.62	34.44	1188	27.49	66.7	12.27	59.54	1480.

TEMPERATURE, C



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 15

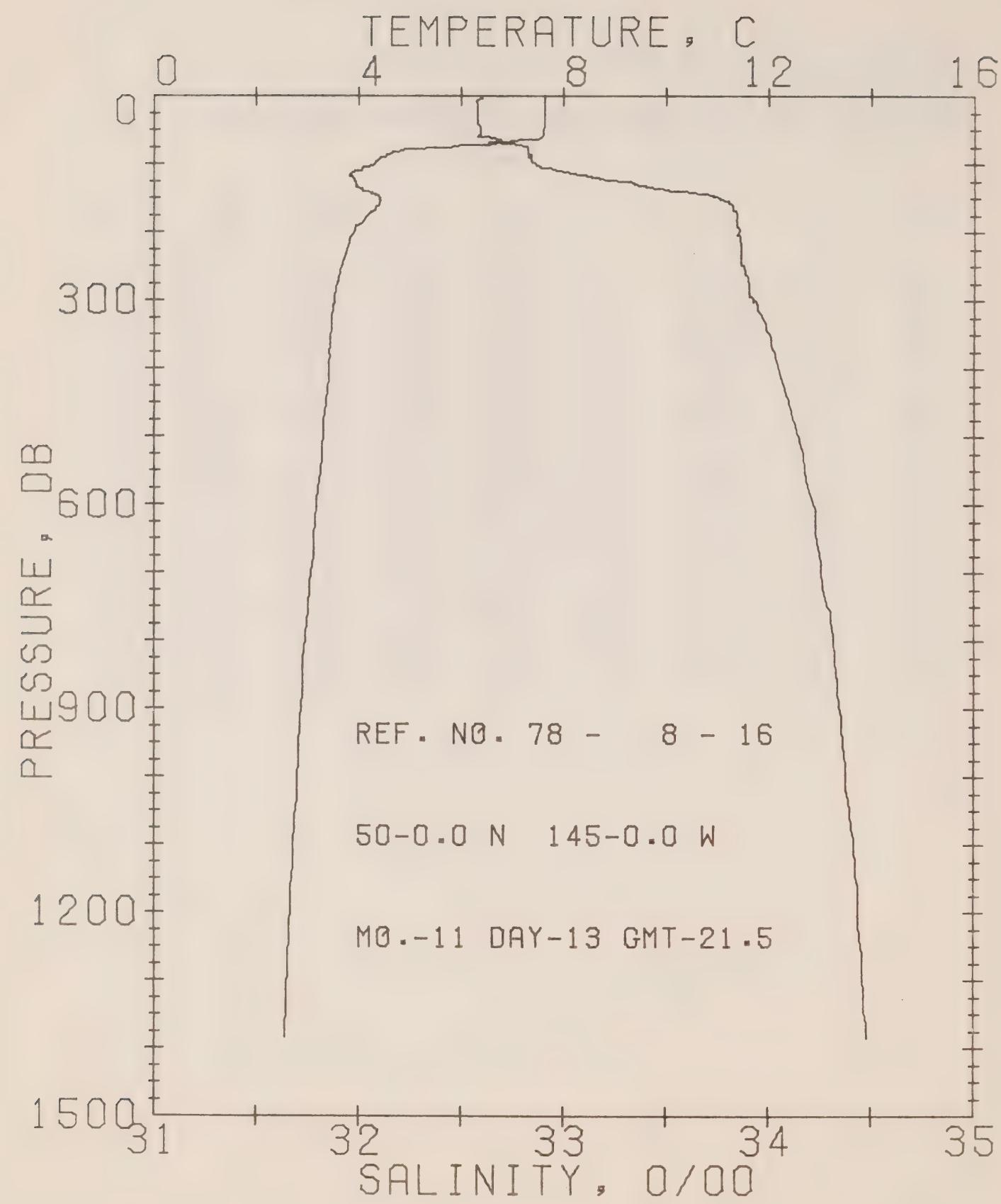
DATE 12/11/78

POSITION 50- .0N, 145- .0W GMT 18.4 STATION P

RESULTS OF STP CAST 262 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.90	32.55	0	25.39	259.5	.00	.00	1479.
10	7.91	32.55	10	25.39	259.5	.26	.01	1480.
20	7.91	32.57	20	25.40	258.5	.52	.05	1480.
30	7.93	32.59	30	25.42	257.4	.78	.12	1480.
50	7.94	32.59	50	25.42	257.6	1.29	.33	1480.
75	6.38	32.81	75	25.80	221.5	1.91	.72	1475.
100	4.63	32.93	99	26.10	192.9	2.42	1.17	1468.
125	4.50	33.50	124	26.57	149.0	2.86	1.67	1469.
150	4.44	33.77	149	26.79	128.4	3.20	2.15	1469.
175	4.31	33.84	174	26.85	122.4	3.51	2.67	1469.
200	4.08	33.85	199	26.89	119.1	3.81	3.24	1469.
225	3.82	33.87	223	26.93	115.2	4.10	3.87	1468.
250	3.66	33.89	248	26.96	112.3	4.39	4.56	1468.
300	3.48	33.93	298	27.01	108.0	4.94	6.10	1468.
400	3.44	34.04	397	27.10	100.0	5.97	9.79	1470.
500	3.36	34.13	496	27.18	92.7	6.93	14.19	1471.
600	3.22	34.22	595	27.26	86.0	7.82	19.18	1472.
800	2.93	34.32	793	27.37	76.3	9.45	30.74	1475.
1000	2.74	34.40	990	27.45	69.8	10.91	44.09	1477.
1200	2.62	34.44	1188	27.49	66.7	12.27	59.33	1480.



OFFSHORE OCEANOGRAPHY GROUP

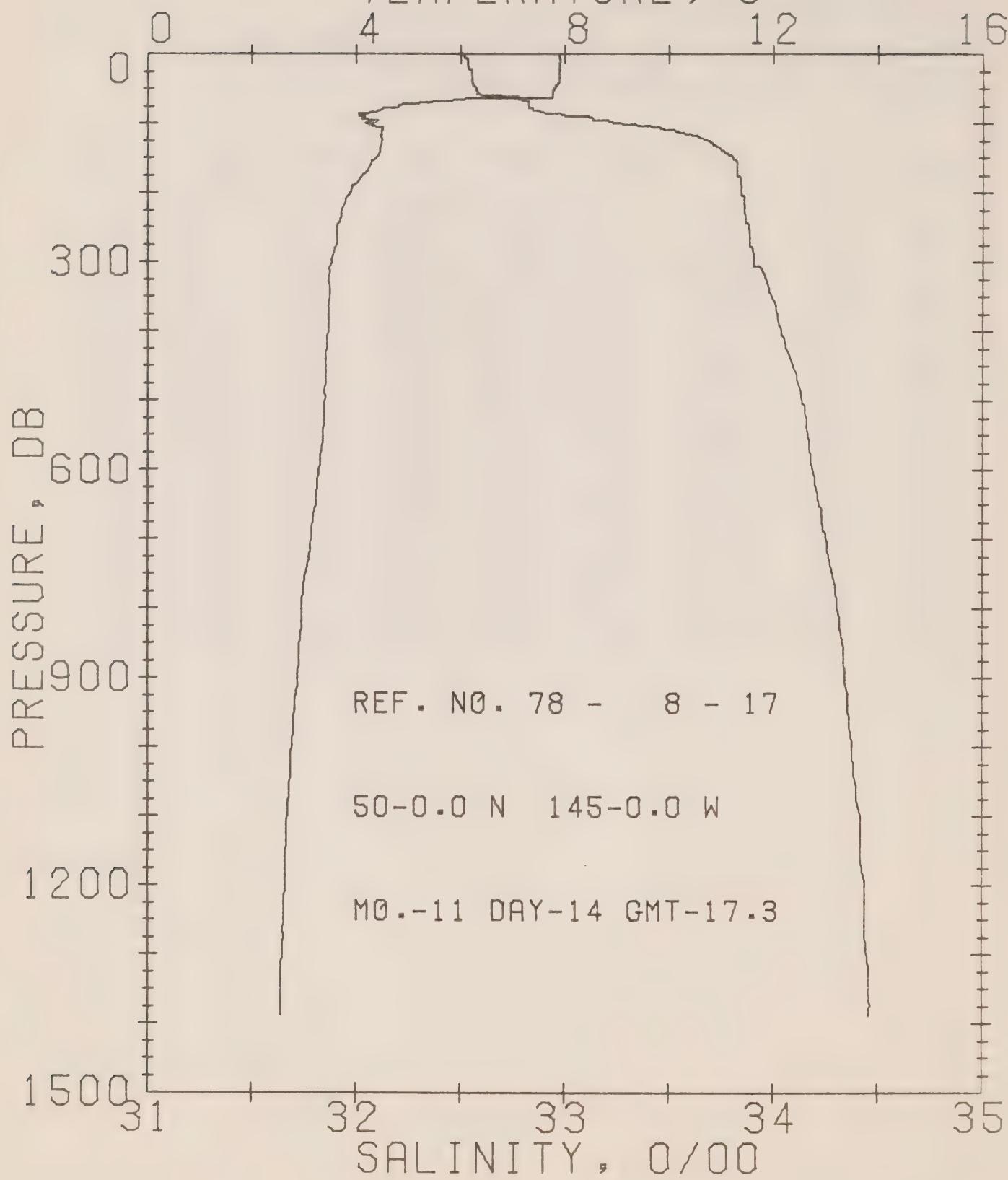
REFERENCE NO. 78- 8- 16

DATE 13/11/78

POSITION 50- .0N, 145- .0W GMT 21.5 STATION P  
RESULTS OF STP CAST 246 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.62	32.60	0	25.47	252.0	.00	.00	1478.
10	7.63	32.57	10	25.45	254.3	.25	.01	1478.
20	7.62	32.58	20	25.45	253.8	.51	.05	1479.
30	7.63	32.58	30	25.45	254.1	.76	.12	1479.
50	7.61	32.59	50	25.46	253.4	1.27	.32	1479.
75	5.74	32.82	75	25.89	213.1	1.88	.71	1472.
100	4.29	32.86	99	26.08	194.7	2.37	1.15	1467.
125	3.93	33.27	124	26.44	160.5	2.82	1.66	1466.
150	4.42	33.76	149	26.78	128.9	3.18	2.17	1469.
175	4.17	33.85	174	26.88	119.8	3.49	2.68	1469.
200	3.89	33.86	199	26.91	116.8	3.79	3.24	1468.
225	3.75	33.87	223	26.94	114.5	4.08	3.87	1468.
250	3.66	33.88	248	26.95	113.3	4.36	4.56	1468.
300	3.53	33.93	298	27.01	108.3	4.91	6.11	1468.
400	3.41	34.05	397	27.11	99.0	5.94	9.77	1470.
500	3.30	34.15	496	27.20	91.4	6.89	14.13	1471.
600	3.17	34.22	595	27.27	85.2	7.78	19.09	1472.
800	2.96	34.32	793	27.37	76.7	9.41	30.65	1475.
1000	2.80	34.38	990	27.43	72.0	10.89	44.24	1477.
1200	2.66	34.44	1188	27.49	67.0	12.27	59.70	1480.

## TEMPERATURE, C



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 17

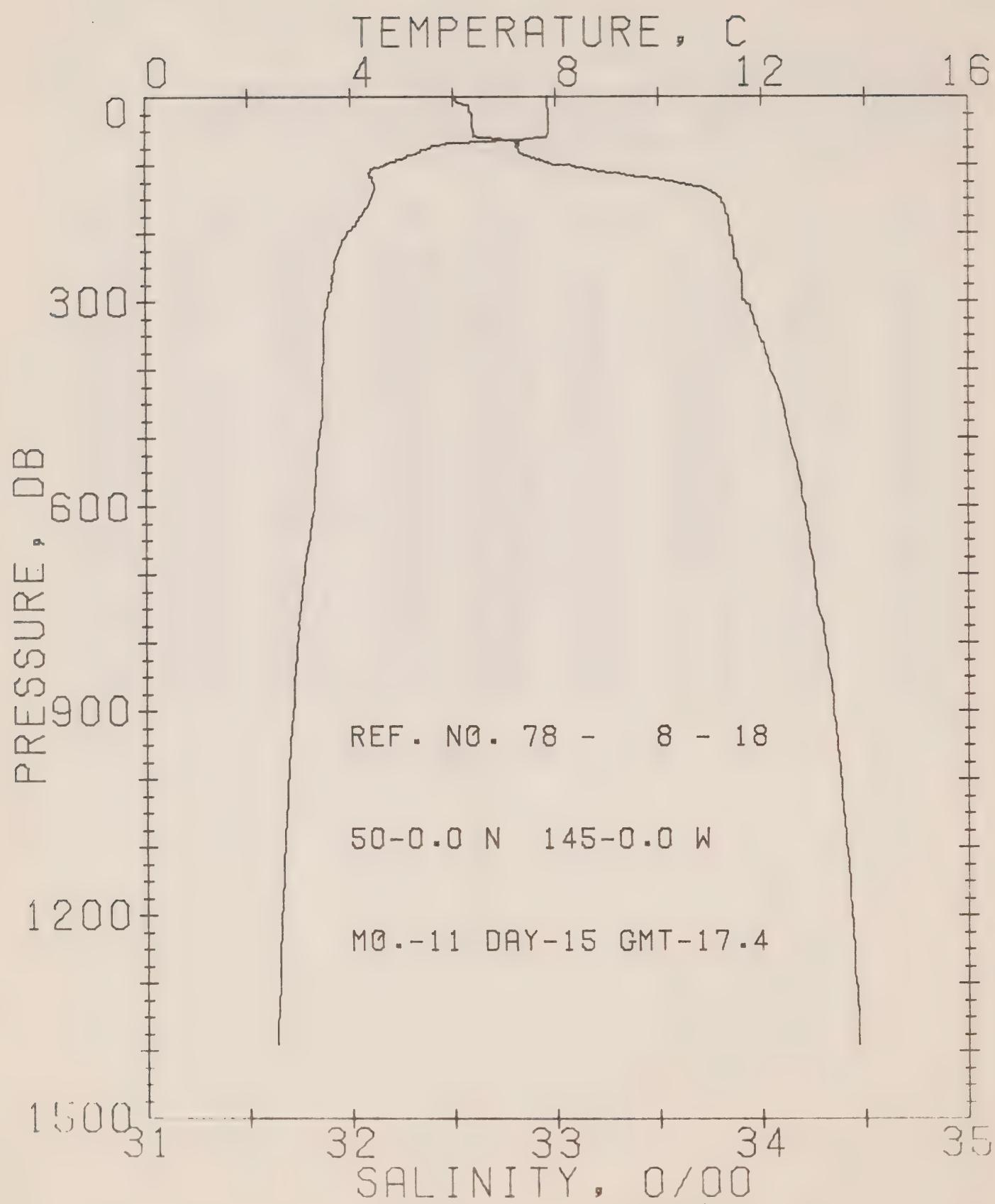
DATE 14/11/78

POSITION 50- .0N, 145- .0W GMT 17.3 STATION P

RESULTS OF STP CAST 266 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.90	32.50	0	25.35	263.3	.00	.00	1479.
10	7.91	32.53	10	25.37	261.3	.26	.01	1480.
20	7.90	32.54	20	25.38	260.8	.52	.05	1480.
30	7.90	32.55	30	25.39	260.0	.78	.12	1480.
50	7.80	32.57	50	25.42	257.4	1.30	.33	1480.
75	4.83	32.83	75	26.00	202.3	1.89	.70	1469.
100	4.21	33.25	99	26.40	164.6	2.35	1.11	1467.
125	4.50	33.68	124	26.71	135.1	2.72	1.53	1469.
150	4.37	33.81	149	26.82	124.7	3.04	1.99	1469.
175	4.13	33.83	174	26.87	120.9	3.35	2.49	1469.
200	3.90	33.85	199	26.91	117.3	3.64	3.06	1468.
225	3.72	33.86	223	26.93	114.9	3.93	3.68	1468.
250	3.64	33.88	248	26.95	112.8	4.22	4.37	1468.
300	3.52	33.91	298	26.99	109.8	4.77	5.93	1468.
400	3.46	34.04	397	27.10	100.2	5.81	9.63	1470.
500	3.39	34.14	496	27.18	93.0	6.78	14.05	1471.
600	3.30	34.19	595	27.23	88.9	7.69	19.14	1473.
800	2.96	34.31	793	27.36	77.6	9.35	30.93	1475.
1000	2.78	34.38	990	27.43	71.6	10.83	44.57	1477.
1200	2.63	34.44	1188	27.49	66.7	12.22	60.04	1480.

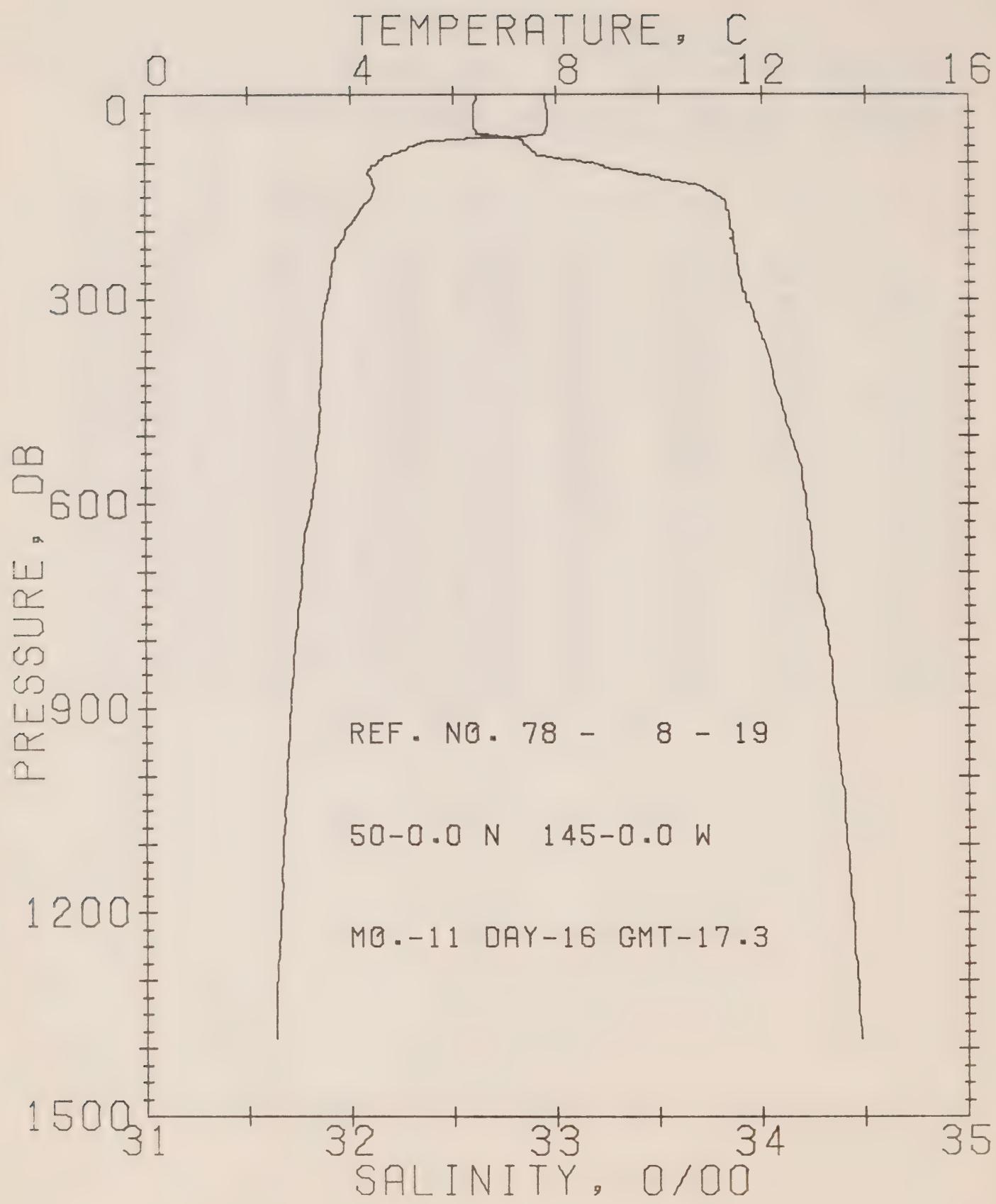


OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 18 DATE 15/11/78

POSITION 50- .0N, 145- .0W GMT 17.4 STATION P  
RESULTS OF STP CAST 2U2 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.83	32.51	0	25.37	261.6	.00	.00	1479.
10	7.85	32.53	10	25.39	260.1	.26	.01	1479.
20	7.86	32.58	20	25.42	257.0	.52	.05	1480.
30	7.87	32.59	30	25.43	256.6	.78	.12	1480.
50	7.86	32.60	50	25.43	256.3	1.29	.33	1480.
75	5.53	32.81	75	25.91	211.2	1.88	.70	1472.
100	4.66	33.05	99	26.19	184.2	2.38	1.15	1469.
125	4.46	33.58	124	26.63	142.6	2.79	1.62	1469.
150	4.41	33.81	149	26.82	125.1	3.12	2.08	1469.
175	4.19	33.84	174	26.87	120.8	3.43	2.59	1469.
200	3.94	33.85	199	26.90	117.7	3.73	3.16	1468.
225	3.78	33.87	223	26.93	114.7	4.02	3.78	1468.
250	3.67	33.89	248	26.96	112.4	4.30	4.47	1468.
300	3.54	33.92	298	27.00	109.2	4.86	6.02	1468.
400	3.44	34.04	397	27.10	99.8	5.89	9.71	1470.
500	3.38	34.14	496	27.18	92.9	6.85	14.11	1471.
600	3.28	34.21	595	27.25	87.2	7.75	19.15	1473.
800	2.95	34.31	793	27.36	77.6	9.40	30.87	1475.
1000	2.76	34.39	990	27.44	71.1	10.88	44.44	1477.
1200	2.62	34.44	1188	27.49	66.9	12.26	59.87	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 19

DATE 16/11/78

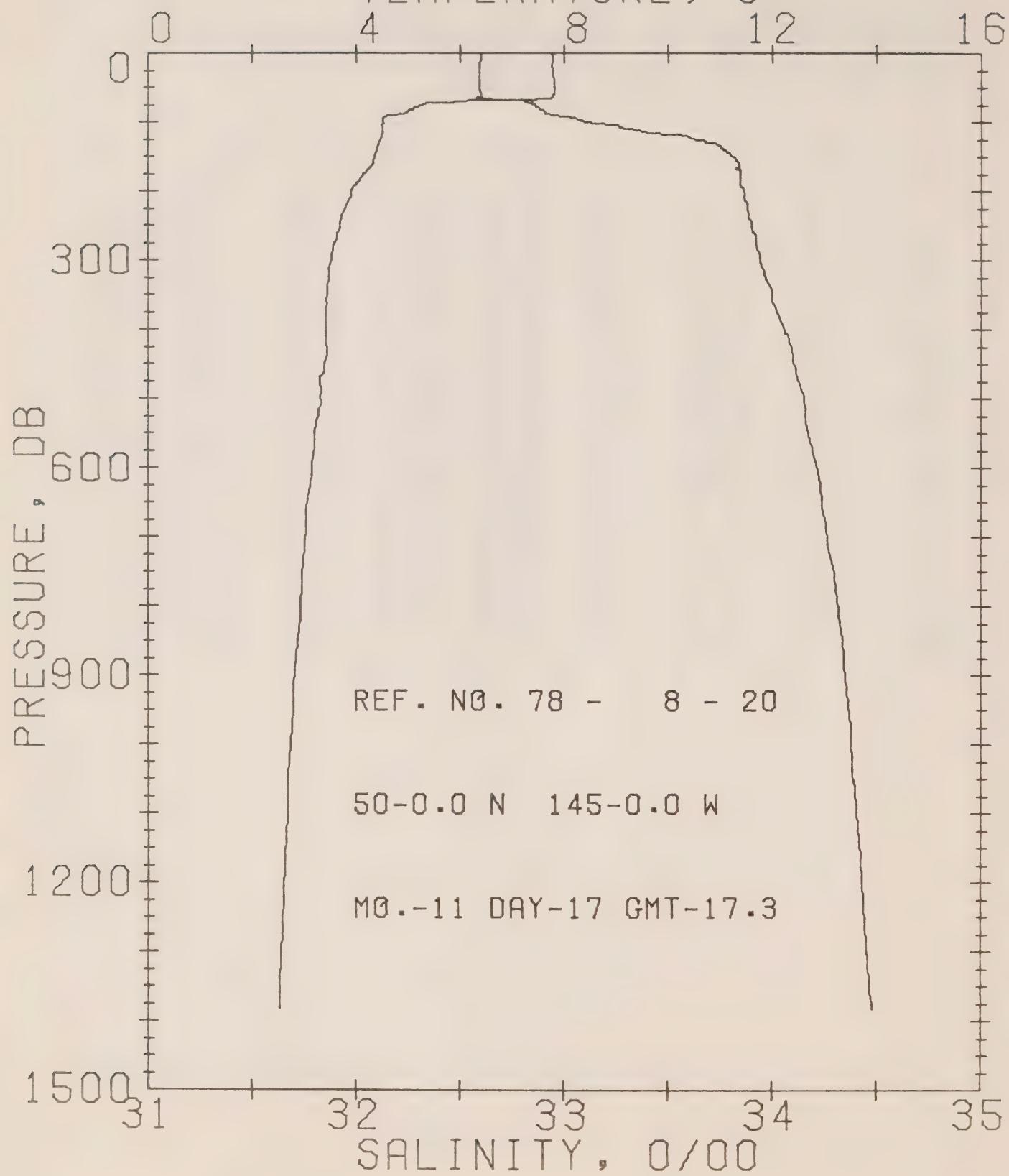
POSITION 50- .0N, 145- .0W GMT 17.3 STATION P

RESULTS OF STP CAST 264 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.79	32.61	0	25.45	253.6	.00	.00	1479.
10	7.79	32.61	10	25.45	254.1	.25	.01	1479.
20	7.81	32.60	20	25.44	254.9	.51	.05	1479.
30	7.83	32.60	30	25.44	255.3	.76	.12	1480.
50	7.82	32.60	50	25.44	255.5	1.27	.33	1480.
75	5.23	32.86	75	25.98	204.3	1.85	.69	1470.
100	4.53	33.17	99	26.30	173.9	2.34	1.12	1468.
125	4.43	33.51	124	26.58	147.5	2.74	1.58	1469.
150	4.40	33.79	149	26.81	126.2	3.07	2.05	1469.
175	4.15	33.84	174	26.87	120.4	3.38	2.55	1469.
200	3.90	33.85	199	26.91	117.0	3.68	3.12	1468.
225	3.71	33.87	223	26.94	114.1	3.97	3.75	1468.
250	3.64	33.88	248	26.95	112.8	4.25	4.43	1468.
300	3.54	33.92	298	27.00	109.2	4.81	5.99	1468.
400	3.42	34.05	397	27.11	99.4	5.84	9.67	1470.
500	3.37	34.14	496	27.19	92.7	6.80	14.08	1471.
600	3.22	34.21	595	27.26	86.5	7.69	19.07	1472.
800	2.91	34.32	793	27.37	76.4	9.32	30.64	1474.
1000	2.75	34.38	990	27.44	71.0	10.79	44.08	1477.
1200	2.62	34.44	1188	27.49	66.7	12.16	59.47	1480.

TEMPERATURE, C



## OFFSHORE OCEANOGRAPHY GROUP

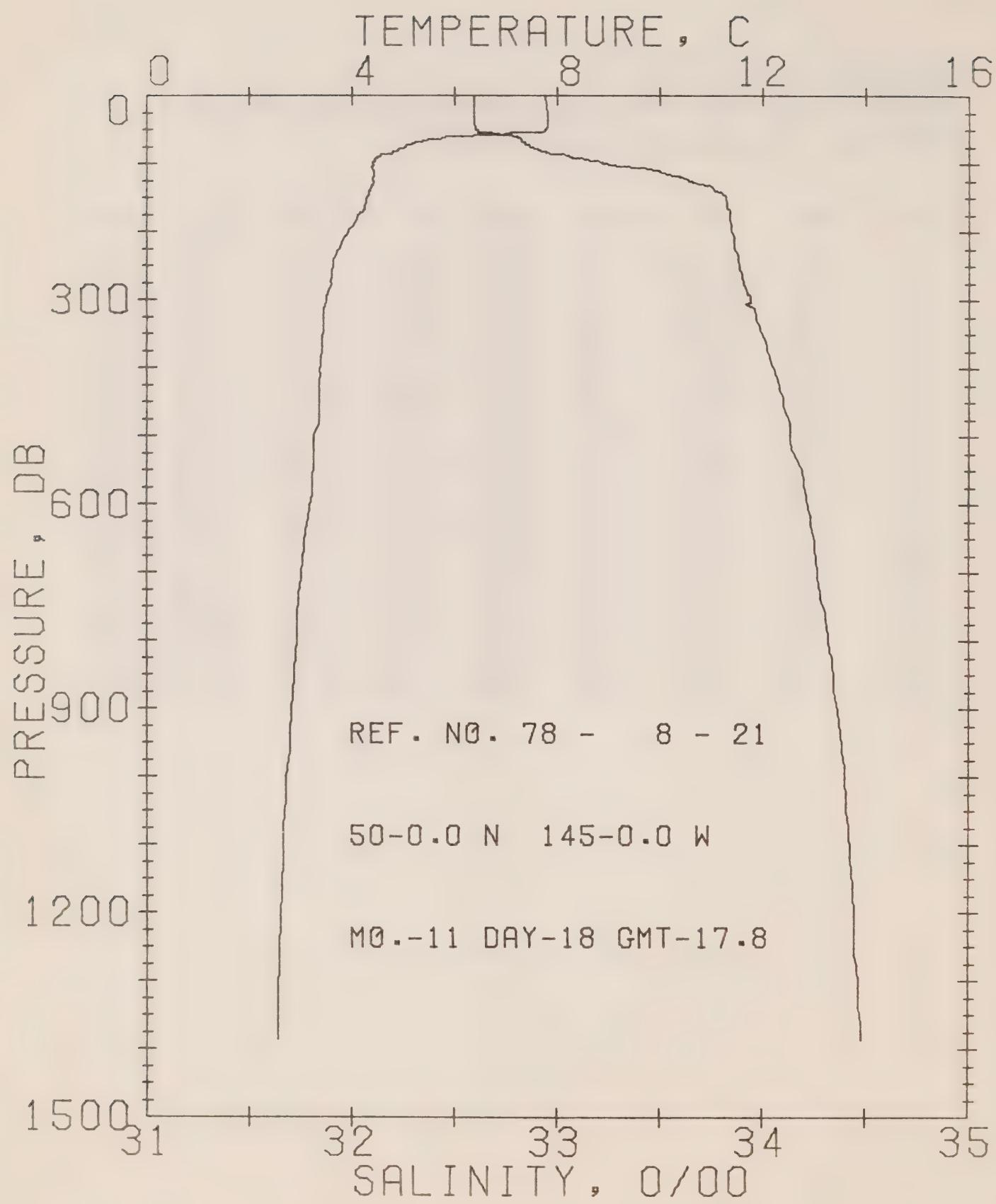
REFERENCE NO. 78- 8- 20 DATE 17/11/78

POSITION 50- .0N, 145- .0W GMT 17.3 STATION P

RESULTS OF STP CAST 217 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.77	32.60	0	25.45	254.1	.00	.00	1479.
10	7.78	32.60	10	25.45	254.4	.25	.01	1479.
20	7.77	32.59	20	25.44	255.1	.51	.05	1479.
30	7.78	32.59	30	25.44	255.4	.76	.12	1479.
50	7.80	32.59	50	25.44	255.9	1.28	.33	1480.
75	5.22	32.86	75	25.98	204.2	1.88	.71	1470.
100	4.52	33.11	99	26.25	178.2	2.37	1.14	1468.
125	4.45	33.63	124	26.67	138.8	2.76	1.59	1469.
150	4.35	33.81	149	26.82	124.7	3.08	2.04	1469.
175	4.12	33.85	174	26.88	119.3	3.39	2.55	1469.
200	3.89	33.86	199	26.92	116.2	3.68	3.11	1468.
225	3.78	33.88	223	26.94	114.0	3.97	3.73	1468.
250	3.67	33.90	248	26.97	111.7	4.25	4.41	1468.
300	3.51	33.94	298	27.02	107.4	4.80	5.95	1468.
400	3.41	34.05	397	27.12	98.6	5.83	9.61	1470.
500	3.32	34.15	496	27.20	91.3	6.78	13.96	1471.
600	3.15	34.21	595	27.27	85.4	7.66	18.93	1472.
800	2.94	34.32	793	27.37	76.9	9.28	30.43	1475.
1000	2.75	34.38	990	27.44	71.1	10.75	43.92	1477.
1200	2.62	34.44	1188	27.49	66.9	12.13	59.37	1480.



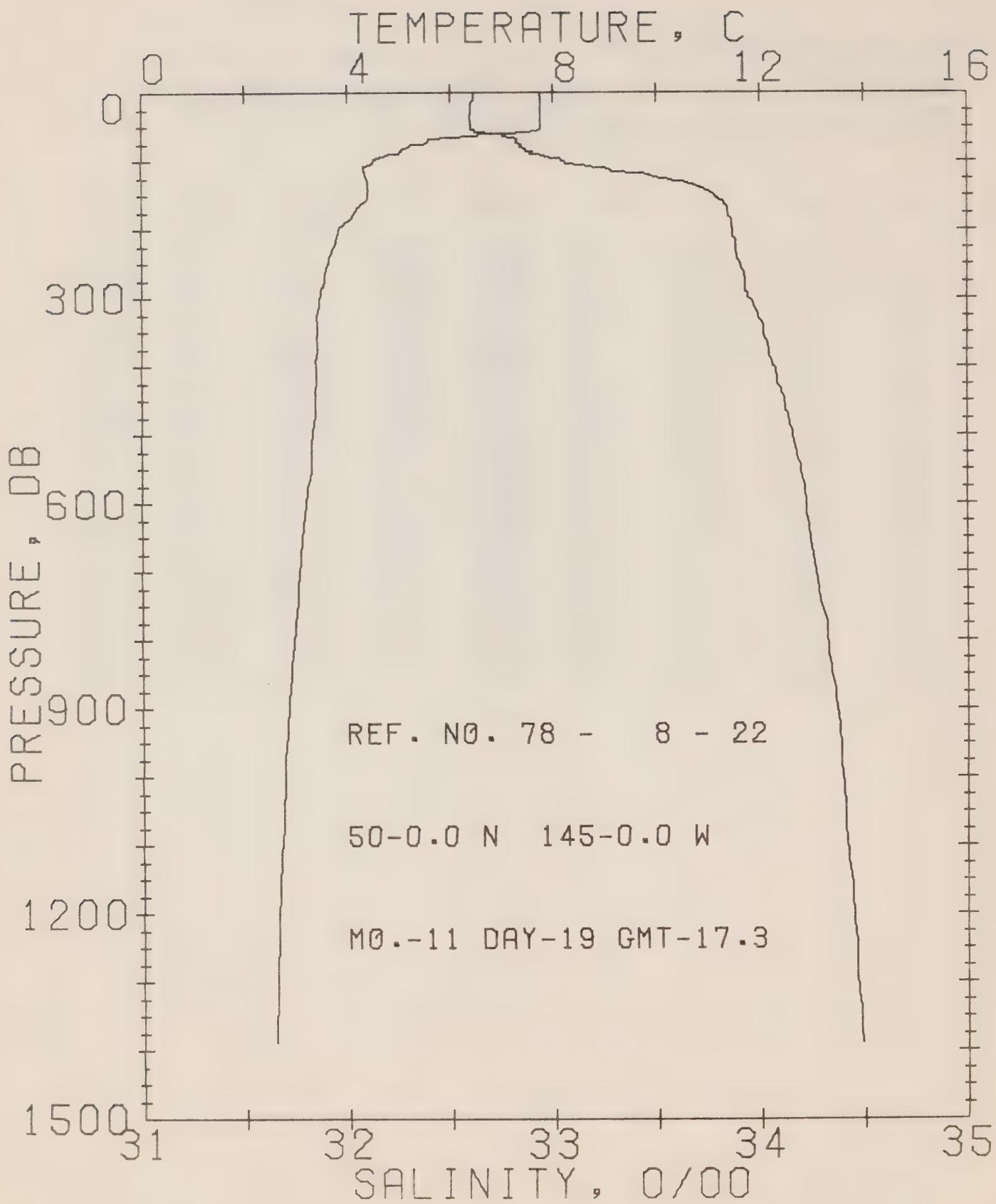
OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 76- 8- 21

DATE 18/11/78

POSITION 50- .0N, 145- .0W GMT 17.8 STATION P  
 RESULTS OF STP CAST 232 POINTS TAKEN FROM ANALOG TRACE  
 GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.77	32.59	0	25.44	254.8	.00	.00	1479.
10	7.79	32.59	10	25.44	255.2	.25	.01	1479.
20	7.79	32.59	20	25.44	255.4	.51	.05	1479.
30	7.80	32.59	30	25.44	255.7	.77	.12	1480.
50	7.79	32.60	50	25.45	255.1	1.28	.33	1480.
75	5.04	32.87	75	26.01	201.5	1.83	.67	1470.
100	4.41	33.23	99	26.36	168.1	2.29	1.09	1468.
125	4.41	33.64	124	26.69	137.6	2.67	1.51	1469.
150	4.29	33.82	149	26.84	123.1	2.99	1.96	1469.
175	4.13	33.84	174	26.87	120.1	3.29	2.47	1469.
200	3.91	33.85	199	26.90	117.4	3.59	3.03	1468.
225	3.75	33.86	223	26.93	114.9	3.88	3.66	1468.
250	3.62	33.89	248	26.97	111.9	4.16	4.35	1468.
300	3.50	33.94	298	27.02	107.3	4.71	5.89	1468.
400	3.37	34.05	397	27.12	98.5	5.74	9.55	1469.
500	3.25	34.13	496	27.19	92.0	6.69	13.90	1471.
600	3.19	34.22	595	27.27	85.6	7.58	18.86	1472.
800	2.93	34.32	793	27.37	76.4	9.19	30.34	1474.
1000	2.73	34.40	990	27.45	69.7	10.64	43.66	1477.
1200	2.62	34.45	1188	27.50	60.0	12.00	58.84	1480.



OFFSHORE OCEANOGRAPHY GROUP

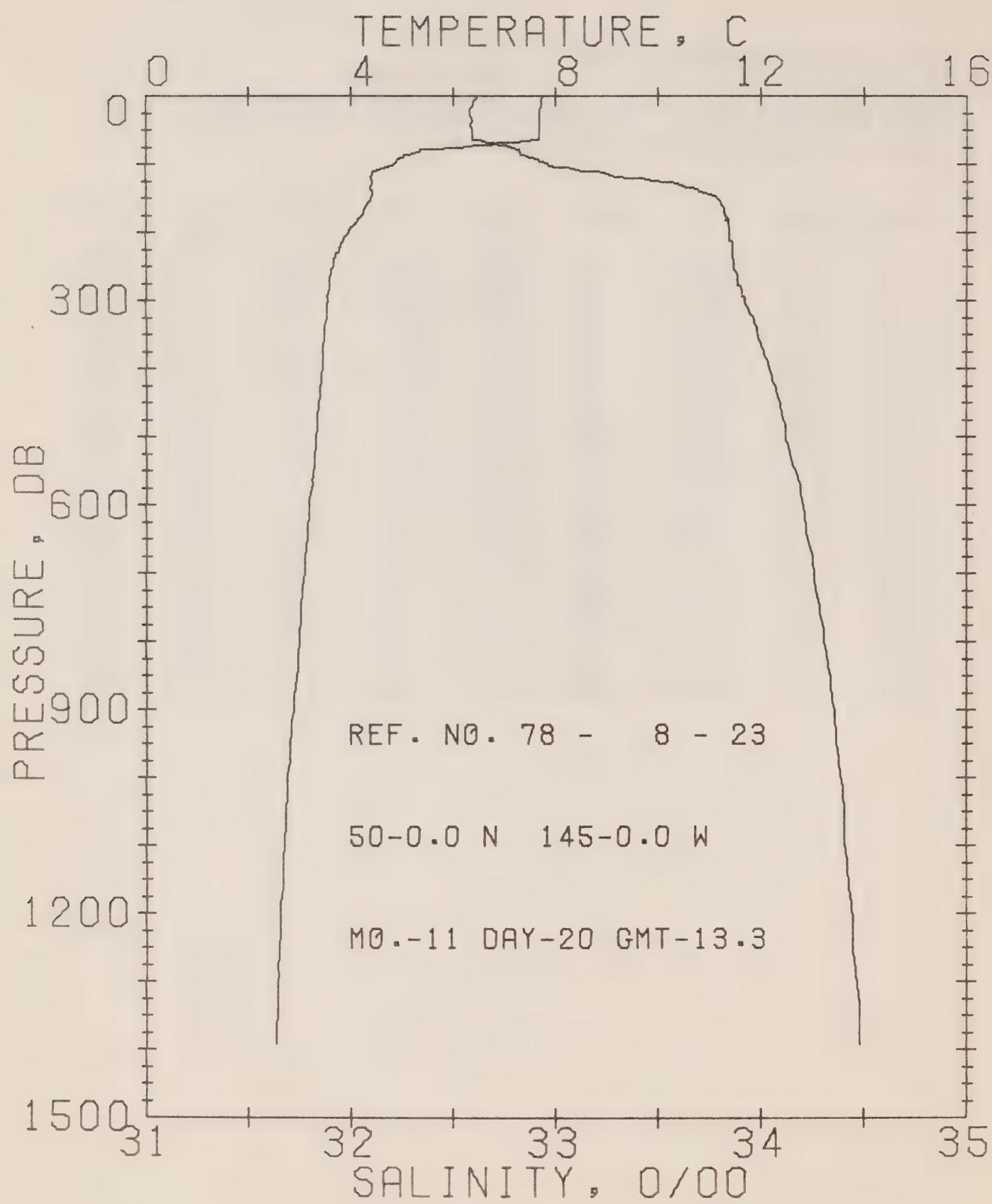
REFERENCE NO. 78- 8- 22 DATE 19/11/78

POSITION 50- .0N, 145- .0W GMT 17.3 STATION P

RESULTS OF STP CAST 224 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.73	32.61	0	25.46	252.8	.00	.00	1479.
10	7.75	32.61	10	25.46	253.2	.25	.01	1479.
20	7.75	32.60	20	25.45	254.1	.51	.05	1479.
30	7.76	32.60	30	25.45	254.6	.76	.12	1479.
50	7.76	32.60	50	25.45	254.7	1.27	.32	1480.
75	5.42	32.84	75	25.94	207.9	1.85	.69	1471.
100	4.50	33.04	99	26.20	183.3	2.34	1.13	1468.
125	4.37	33.52	124	26.60	146.2	2.75	1.60	1468.
150	4.39	33.78	149	26.79	127.5	3.09	2.07	1469.
175	4.12	33.84	174	26.88	119.8	3.40	2.58	1469.
200	3.82	33.87	199	26.93	115.1	3.69	3.14	1468.
225	3.72	33.88	223	26.95	113.4	3.98	3.76	1468.
250	3.62	33.90	248	26.97	111.1	4.26	4.44	1468.
300	3.45	33.94	298	27.02	106.8	4.80	5.96	1468.
400	3.38	34.06	397	27.12	97.7	5.82	9.57	1469.
500	3.31	34.15	496	27.20	91.1	6.76	13.89	1471.
600	3.18	34.22	595	27.27	85.4	7.64	18.82	1472.
800	2.93	34.32	793	27.38	76.2	9.26	30.34	1474.
1000	2.74	34.40	990	27.45	70.1	10.71	43.67	1477.
1200	2.62	34.45	1188	27.50	65.9	12.08	58.96	1480.

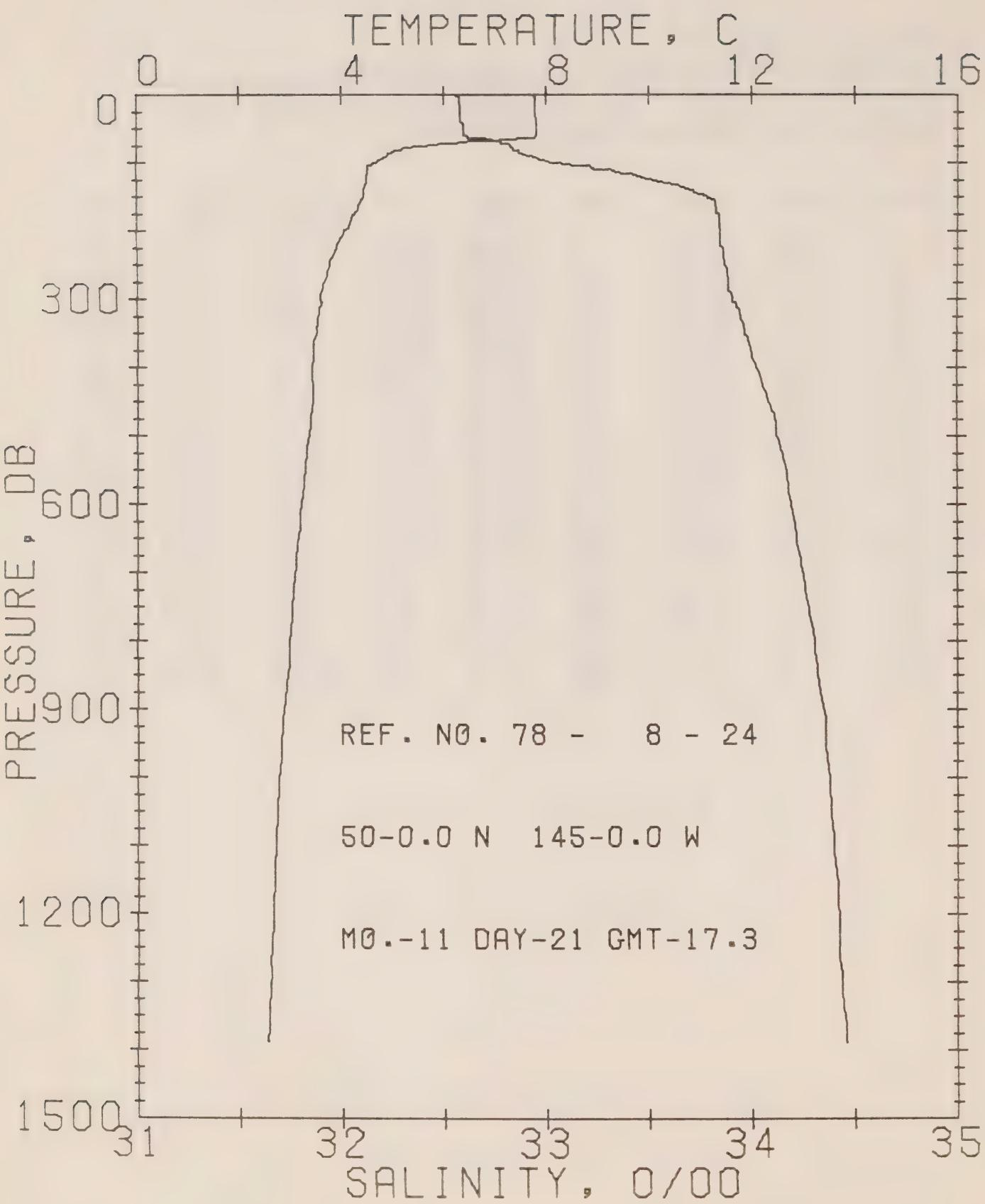


OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 23 DATE 20/11/78

POSITION 50- .0N, 145- .0W GMT 13.3 STATION P  
RESULTS OF STP CAST 259 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.72	32.61	0	25.46	252.6	.00	.00	1479.
10	7.73	32.60	10	25.45	253.6	.25	.01	1479.
20	7.69	32.58	20	25.44	254.8	.51	.05	1479.
30	7.67	32.58	30	25.45	254.5	.76	.12	1479.
50	7.67	32.59	50	25.45	254.3	1.27	.32	1479.
75	6.14	32.78	75	25.81	220.8	1.89	.71	1474.
100	4.82	32.96	99	26.10	192.6	2.39	1.17	1469.
125	4.41	33.51	124	26.58	147.3	2.82	1.65	1469.
150	4.37	33.79	149	26.81	126.2	3.16	2.12	1469.
175	4.20	33.83	174	26.86	121.6	3.47	2.64	1469.
200	3.95	33.85	199	26.90	117.8	3.77	3.21	1468.
225	3.75	33.86	223	26.93	115.3	4.06	3.84	1468.
250	3.65	33.87	248	26.95	113.7	4.34	4.53	1468.
300	3.55	33.92	298	27.00	109.3	4.90	6.09	1468.
400	3.42	34.04	397	27.10	100.1	5.94	9.80	1470.
500	3.32	34.12	496	27.18	93.5	6.90	14.20	1471.
600	3.17	34.20	595	27.26	86.5	7.80	19.23	1472.
800	2.98	34.31	793	27.36	77.8	9.44	30.90	1475.
1000	2.76	34.39	990	27.44	70.5	10.92	44.45	1477.
1200	2.61	34.44	1188	27.50	66.2	12.29	59.82	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 24

DATE 21/11/78

POSITION 50- .0N, 145- .0W GMT 17.3 STATION P

RESULTS OF STP CAST 226 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.77	32.56	0	25.42	257.0	.00	.00	1479.
10	7.79	32.57	10	25.42	256.7	.26	.01	1479.
20	7.79	32.58	20	25.43	256.1	.51	.05	1479.
30	7.79	32.58	30	25.43	256.3	.77	.12	1479.
50	7.80	32.59	50	25.44	255.9	1.28	.33	1480.
75	5.55	32.82	75	25.91	210.9	1.89	.71	1472.
100	4.61	33.05	99	26.20	183.7	2.39	1.15	1468.
125	4.48	33.51	124	26.58	148.1	2.79	1.62	1469.
150	4.42	33.79	149	26.80	126.7	3.13	2.09	1469.
175	4.22	33.84	174	26.86	121.1	3.44	2.61	1469.
200	4.05	33.85	199	26.89	118.7	3.74	3.18	1469.
225	3.89	33.86	223	26.91	116.8	4.04	3.82	1469.
250	3.76	33.87	248	26.94	114.8	4.33	4.52	1468.
300	3.59	33.91	298	26.98	110.5	4.89	6.10	1469.
400	3.41	34.02	397	27.09	101.0	5.94	9.84	1470.
500	3.35	34.12	496	27.18	93.6	6.91	14.29	1471.
600	3.20	34.19	595	27.24	87.6	7.81	19.33	1472.
800	2.96	34.31	793	27.36	77.7	9.47	31.11	1475.
1000	2.76	34.38	990	27.43	71.6	10.96	44.78	1477.
1200	2.64	34.43	1188	27.48	67.9	12.36	60.39	1480.

60

## TEMPERATURE, C

PRESSURE, DB

300

600

900

1200

1500

4

8

12

16

REF. NO. 78 - 8 - 25

50-0.0 N 145-0.0 W

MO.-11 DAY-22 GMT-17.4

31

32

33

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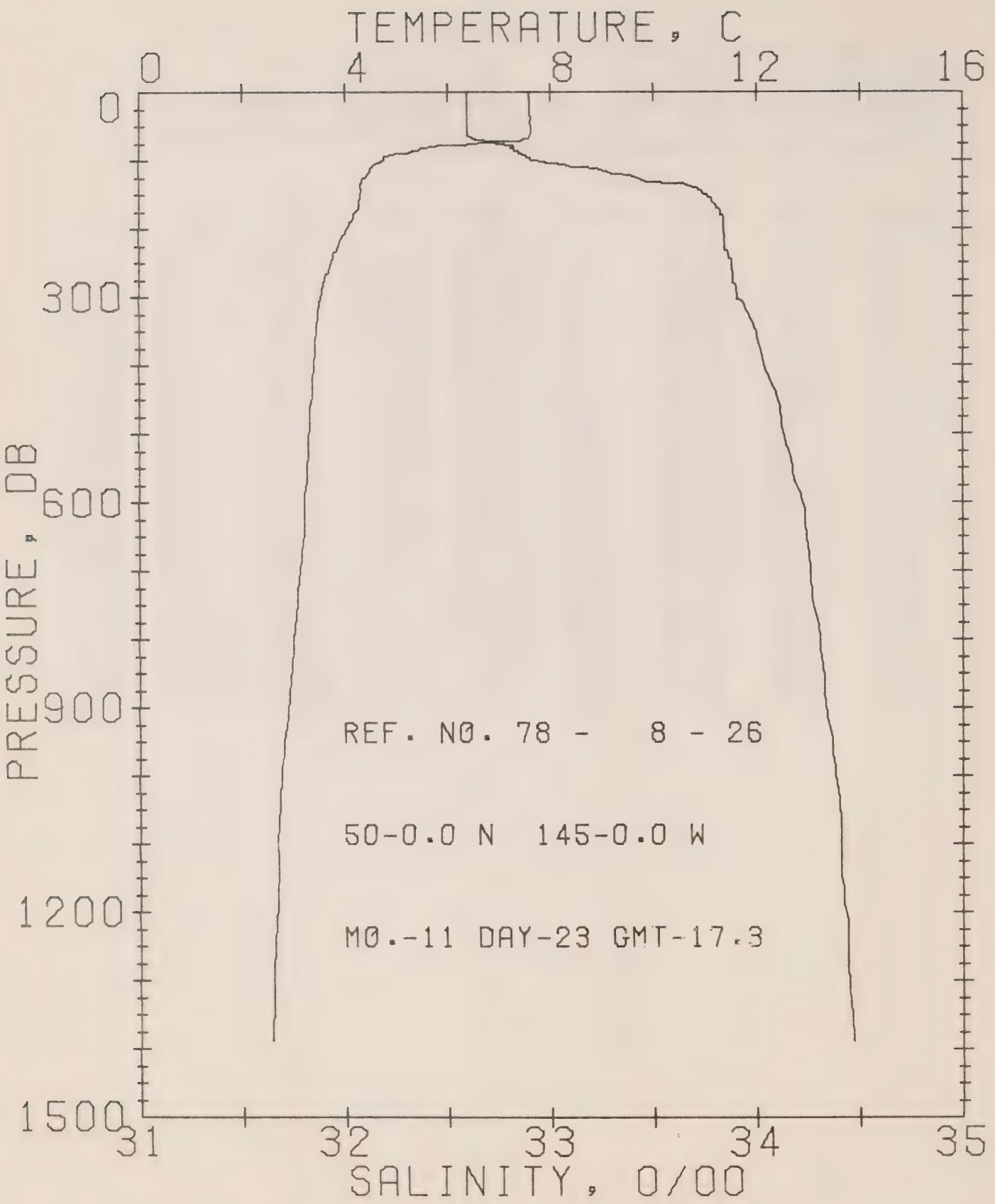
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OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 25 DATE 22/11/78

POSITION 50- .0N, 145- .0W GMT 17.4 STATION P  
RESULTS OF STP CAST 250 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.61	32.59	0	25.46	252.6	.00	.00	1478.
10	7.63	32.60	10	25.47	252.3	.25	.01	1479.
20	7.63	32.59	20	25.46	253.2	.51	.05	1479.
30	7.64	32.59	30	25.46	253.5	.76	.12	1479.
50	7.60	32.59	50	25.46	253.2	1.27	.32	1479.
75	6.05	32.81	75	25.84	217.5	1.88	.72	1474.
100	4.59	33.02	99	26.18	185.7	2.38	1.16	1468.
125	4.35	33.48	124	26.57	149.0	2.80	1.64	1468.
150	4.25	33.76	149	26.80	126.8	3.14	2.11	1469.
175	4.13	33.83	174	26.87	120.9	3.45	2.62	1469.
200	3.97	33.85	199	26.90	118.0	3.75	3.19	1468.
225	3.81	33.86	223	26.92	115.8	4.04	3.82	1468.
250	3.66	33.89	248	26.96	112.3	4.32	4.52	1468.
300	3.45	33.94	298	27.02	106.8	4.87	6.05	1468.
400	3.37	34.04	397	27.10	99.7	5.90	9.71	1469.
500	3.30	34.13	496	27.19	92.5	6.86	14.13	1471.
600	3.22	34.21	595	27.26	86.6	7.76	19.15	1472.
800	2.95	34.32	793	27.37	76.8	9.40	30.83	1475.
1000	2.77	34.39	990	27.44	70.9	10.89	44.43	1477.
1200	2.62	34.43	1188	27.49	67.4	12.27	59.90	1480.

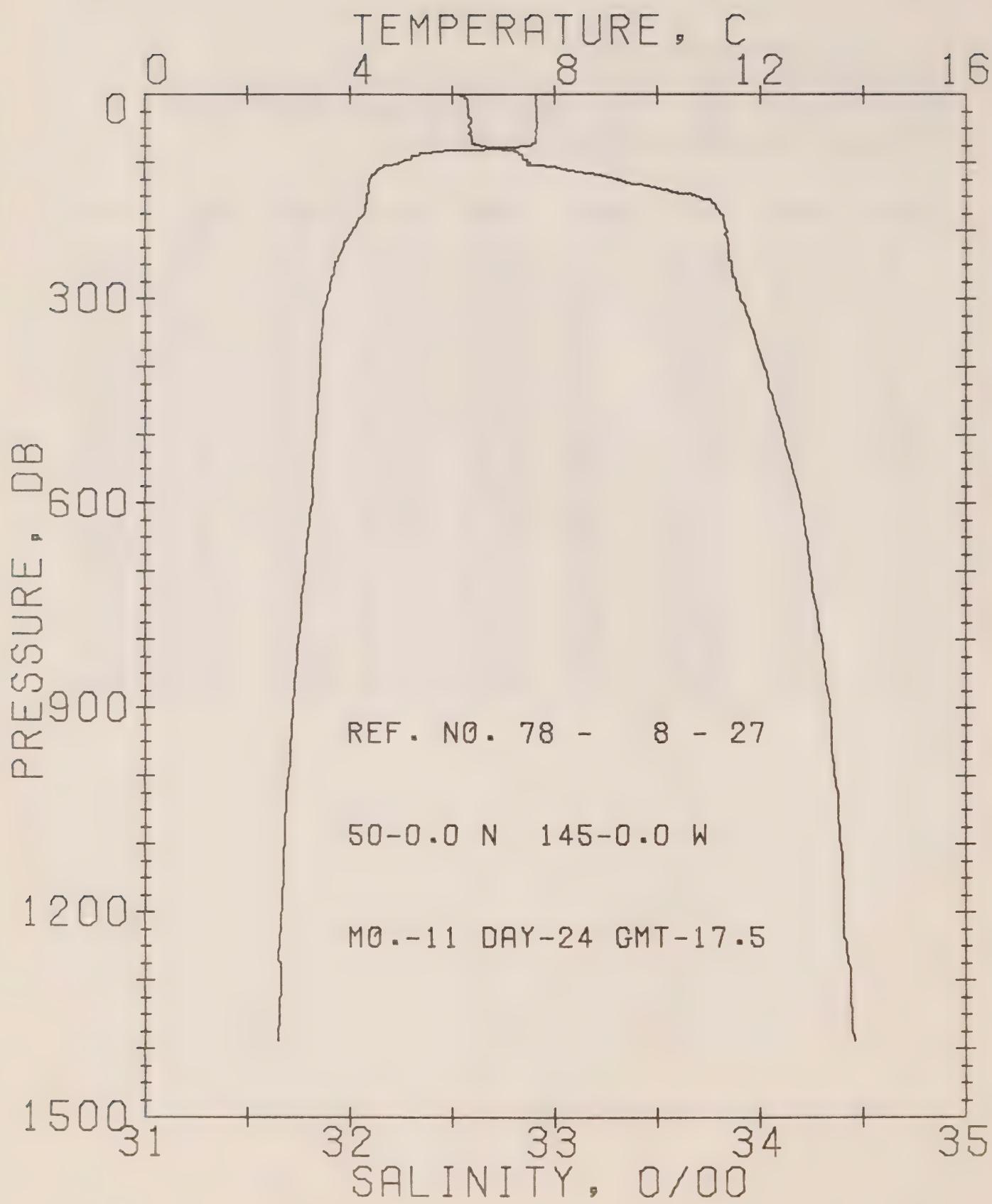


OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 26 DATE 23/11/78

POSITION 50- .0N, 145- .0W GMT 17.3 STATION P  
RESULTS OF STP CAST 221 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.57	32.59	0	25.47	252.1	.00	.00	1478.
10	7.59	32.59	10	25.47	252.5	.25	.01	1478.
20	7.59	32.59	20	25.47	252.7	.50	.05	1479.
30	7.60	32.59	30	25.46	252.9	.76	.12	1479.
50	7.63	32.59	50	25.46	253.6	1.26	.32	1479.
75	6.50	32.74	75	25.73	228.2	1.89	.72	1475.
100	4.73	32.93	99	26.09	193.9	2.41	1.18	1469.
125	4.35	33.42	124	26.52	153.5	2.84	1.67	1468.
150	4.29	33.75	149	26.79	128.1	3.18	2.16	1469.
175	4.20	33.83	174	26.86	121.6	3.50	2.67	1469.
200	4.03	33.84	199	26.88	119.3	3.80	3.25	1469.
225	3.87	33.85	223	26.91	117.1	4.09	3.89	1468.
250	3.73	33.88	248	26.95	113.8	4.38	4.59	1468.
300	3.52	33.91	298	26.99	109.8	4.94	6.15	1468.
400	3.39	34.03	397	27.10	100.2	5.98	9.84	1469.
500	3.30	34.13	496	27.18	92.8	6.93	14.22	1471.
600	3.20	34.22	595	27.27	85.7	7.82	19.22	1472.
800	2.99	34.31	793	27.36	78.0	9.47	30.93	1475.
1000	2.75	34.38	990	27.44	71.3	10.97	44.65	1477.
1200	2.65	34.43	1188	27.48	67.8	12.35	60.17	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 27 DATE 24/11/78

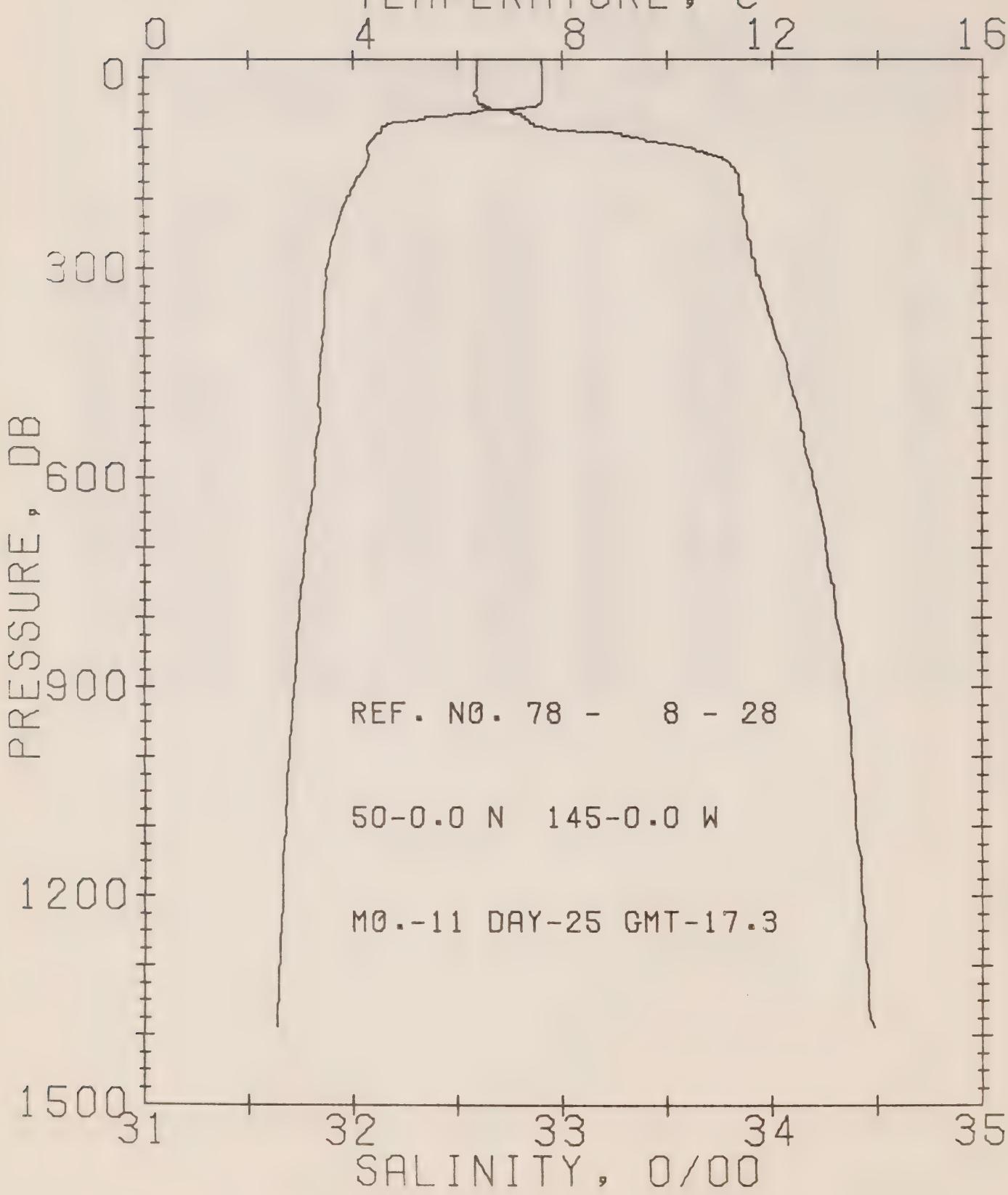
POSITION 50- .0N, 145- .0W GMT 17.5 STATION P

RESULTS OF STP CAST 241 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.63	32.54	0	25.42	256.6	.00	.00	1478.
10	7.64	32.57	10	25.44	254.7	.26	.01	1479.
20	7.65	32.57	20	25.44	254.7	.51	.05	1479.
30	7.66	32.57	30	25.44	254.9	.76	.12	1479.
50	7.66	32.58	50	25.45	254.6	1.27	.32	1479.
75	7.50	32.64	75	25.52	248.5	1.91	.73	1479.
100	4.93	32.88	99	26.03	199.8	2.45	1.21	1470.
125	4.36	33.31	124	26.43	161.8	2.90	1.72	1468.
150	4.31	33.69	149	26.74	133.0	3.27	2.24	1469.
175	4.27	33.81	174	26.84	123.8	3.59	2.76	1469.
200	4.03	33.84	199	26.88	119.6	3.89	3.34	1469.
225	3.85	33.85	223	26.91	117.0	4.19	3.99	1468.
250	3.71	33.86	248	26.93	115.1	4.48	4.69	1468.
300	3.55	33.90	298	26.98	110.8	5.04	6.27	1468.
400	3.41	34.02	397	27.09	101.3	6.09	10.02	1470.
500	3.33	34.11	496	27.17	94.1	7.07	14.49	1471.
600	3.25	34.20	595	27.25	87.4	7.98	19.58	1472.
800	2.98	34.30	793	27.35	78.4	9.64	31.41	1475.
1000	2.80	34.36	990	27.42	73.1	11.15	45.25	1477.
1200	2.66	34.41	1188	27.47	69.3	12.56	61.09	1480.

TEMPERATURE, C

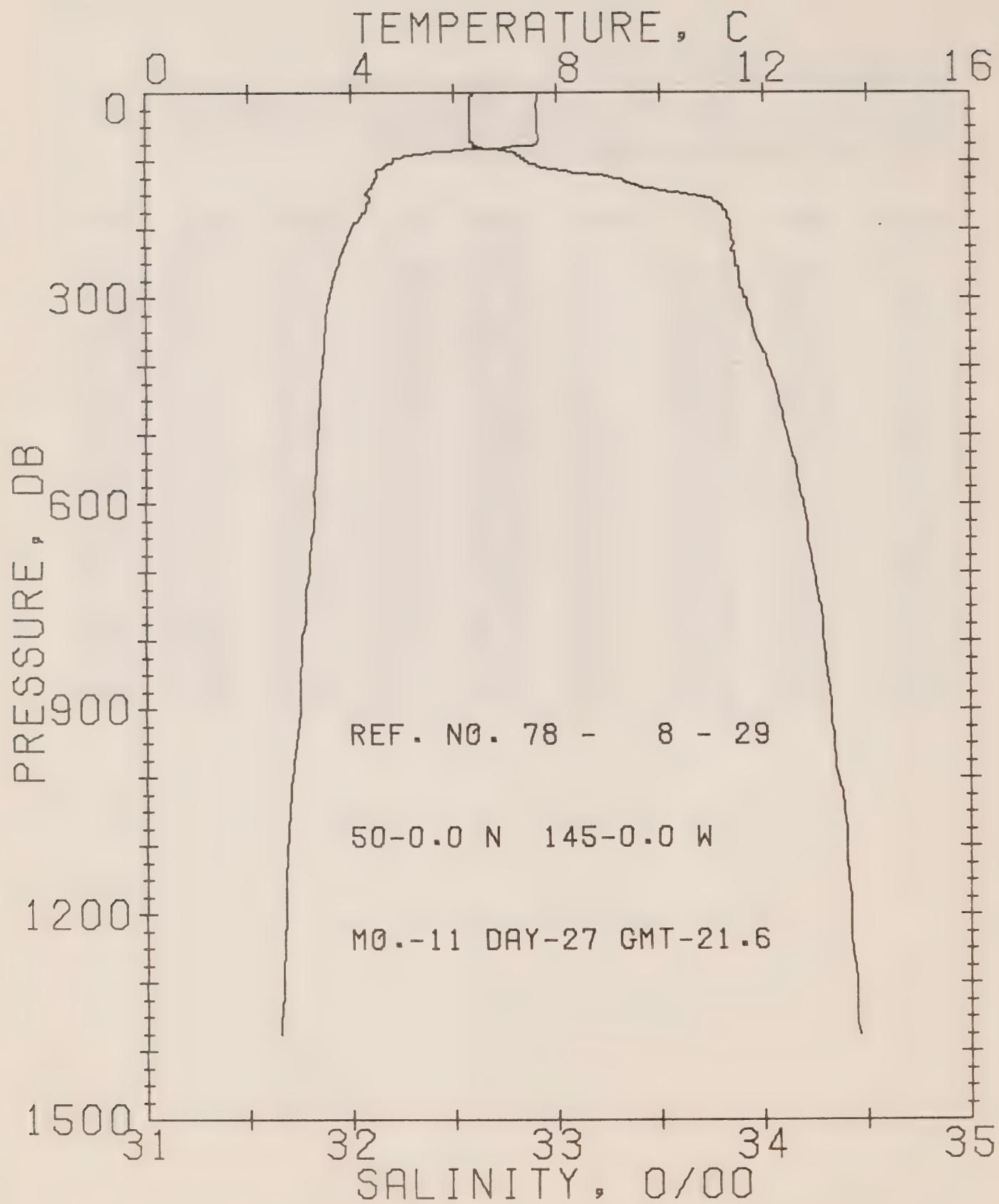


OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 28 DATE 25/11/78

POSITION 50- .0N, 145- .0W GMT 17.3 STATION P  
RESULTS OF STP CAST 251 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.59	32.59	0	25.47	252.4	.00	.00	1478.
10	7.62	32.59	10	25.46	252.9	.25	.01	1478.
20	7.62	32.59	20	25.46	253.1	.51	.05	1479.
30	7.63	32.59	30	25.46	253.3	.76	.12	1479.
50	7.64	32.58	50	25.45	254.5	1.27	.32	1479.
75	6.31	32.75	75	25.76	225.1	1.89	.72	1475.
100	4.57	32.96	99	26.13	190.0	2.40	1.17	1468.
125	4.28	33.59	124	26.66	140.0	2.80	1.63	1468.
150	4.26	33.80	149	26.83	124.3	3.13	2.09	1469.
175	4.04	33.84	174	26.88	119.2	3.43	2.59	1468.
200	3.88	33.86	199	26.92	116.3	3.73	3.16	1468.
225	3.74	33.87	223	26.94	114.4	4.02	3.78	1468.
250	3.65	33.88	248	26.95	112.9	4.30	4.47	1468.
300	3.48	33.92	298	27.00	108.6	4.85	6.01	1468.
400	3.39	34.02	397	27.09	101.1	5.90	9.74	1469.
500	3.35	34.12	496	27.17	93.8	6.87	14.18	1471.
600	3.26	34.19	595	27.24	88.2	7.78	19.27	1472.
800	2.95	34.31	793	27.36	77.5	9.42	30.92	1475.
1000	2.76	34.38	990	27.44	71.2	10.89	44.42	1477.
1200	2.63	34.43	1188	27.49	67.3	12.27	59.90	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 29

DATE 27/11/78

POSITION 50- .0N, 145- .0W GMT 21.6 STATION P

RESULTS OF STP CAST 243 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.63	32.59	0	25.46	252.9	.00	.00	1478.
10	7.62	32.58	10	25.45	253.7	.25	.01	1478.
20	7.61	32.58	20	25.45	253.7	.51	.05	1479.
30	7.63	32.58	30	25.45	254.1	.76	.12	1479.
50	7.63	32.58	50	25.45	254.4	1.27	.32	1479.
75	7.60	32.59	75	25.46	253.6	1.91	.73	1479.
100	4.83	32.85	99	26.02	201.0	2.46	1.22	1469.
125	4.47	33.28	124	26.39	165.2	2.92	1.75	1469.
150	4.32	33.66	149	26.71	135.4	3.31	2.28	1469.
175	4.26	33.82	174	26.84	123.0	3.62	2.81	1469.
200	3.99	33.85	199	26.89	118.5	3.92	3.38	1469.
225	3.87	33.86	223	26.91	116.8	4.22	4.02	1468.
250	3.75	33.87	248	26.94	114.6	4.51	4.72	1468.
300	3.56	33.91	298	26.99	110.2	5.07	6.30	1468.
400	3.43	34.02	397	27.09	101.4	6.13	10.06	1470.
500	3.33	34.11	496	27.17	94.1	7.10	14.52	1471.
600	3.28	34.19	595	27.24	88.5	8.01	19.63	1472.
800	3.02	34.29	793	27.34	79.5	9.69	31.57	1475.
1000	2.82	34.36	990	27.41	73.6	11.23	45.66	1477.
1200	2.69	34.42	1188	27.47	68.9	12.64	61.42	1480.

TEMPERATURE, C

PRESSURE, DB

300

600

900

1200

1500

0

4

8

12

16

REF. NO. 78 - 8 - 30

50-0.0 N 145-0.0 W

MO.-11 DAY-28 GMT-17.3

31

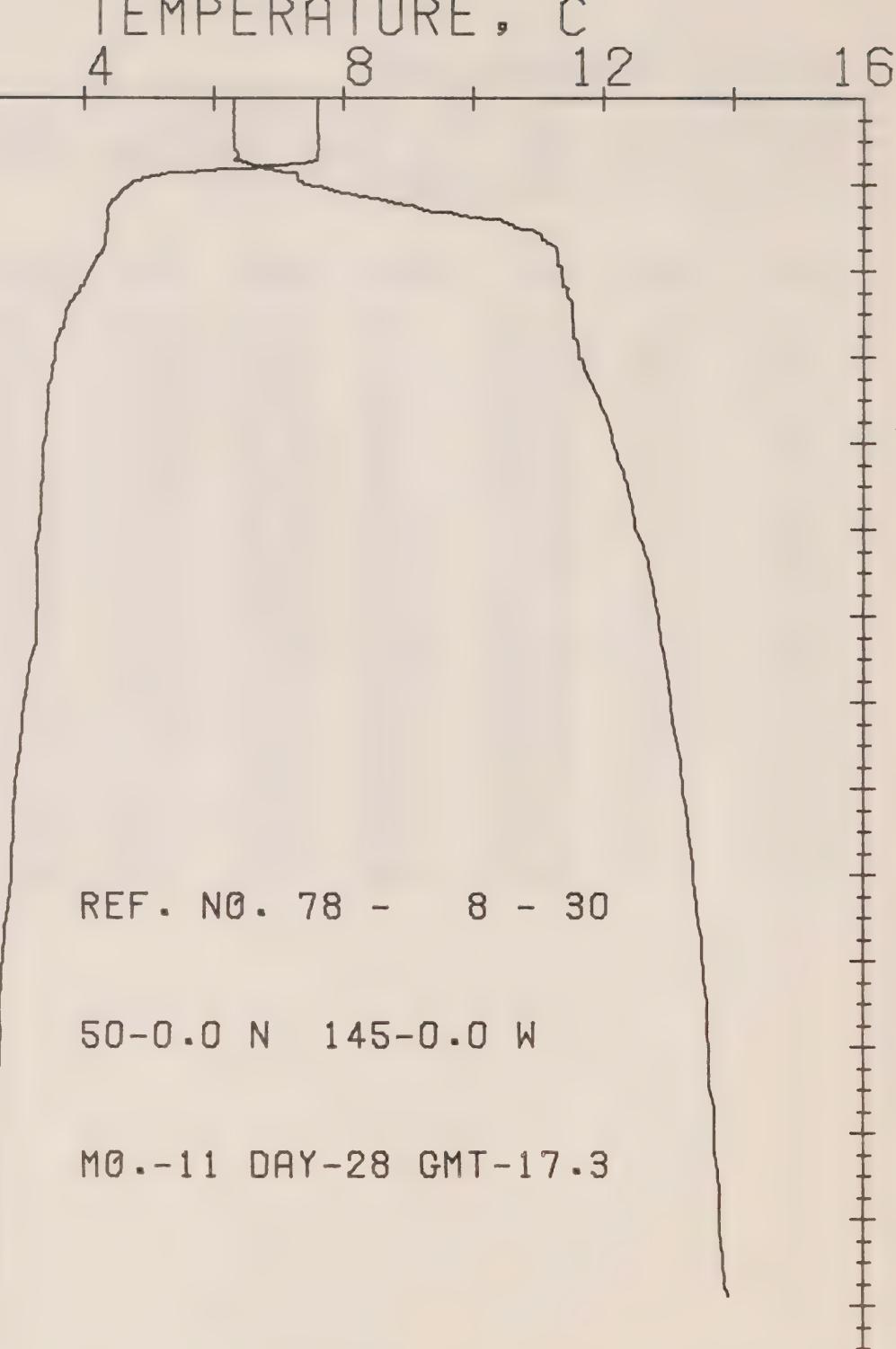
32

33

34

35

SALINITY, P/00



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 30

DATE 28/11/78

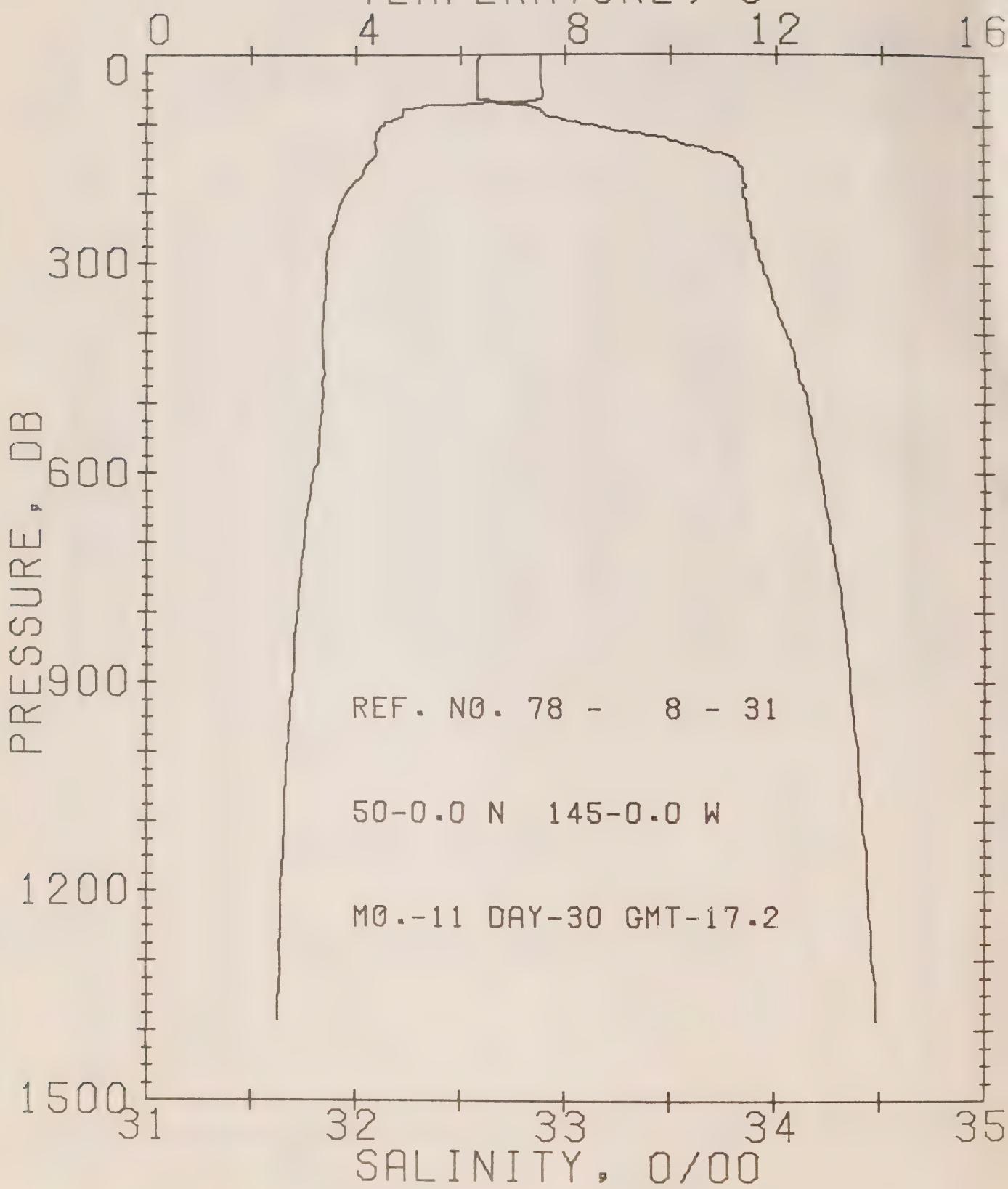
POSITION 50- .0N, 145- .0W GMT 17.3 STATION P

RESULTS OF STP CAST 228 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.59	32.58	0	25.46	253.1	.00	.00	1478.
10	7.61	32.58	10	25.45	253.5	.25	.01	1478.
20	7.61	32.58	20	25.45	253.7	.51	.05	1479.
30	7.60	32.58	30	25.46	253.7	.76	.12	1479.
50	7.62	32.58	50	25.45	254.2	1.27	.32	1479.
75	7.32	32.63	75	25.53	246.9	1.90	.73	1478.
100	4.70	32.85	99	26.03	199.6	2.44	1.21	1469.
125	4.37	33.26	124	26.39	165.2	2.90	1.73	1468.
150	4.35	33.66	149	26.71	135.7	3.27	2.25	1469.
175	4.29	33.82	174	26.84	123.3	3.59	2.78	1469.
200	4.10	33.84	199	26.88	120.0	3.89	3.36	1469.
225	3.90	33.86	223	26.91	116.7	4.19	4.00	1469.
250	3.70	33.88	248	26.95	113.5	4.48	4.69	1468.
300	3.56	33.91	298	26.99	110.2	5.04	6.25	1468.
400	3.38	34.03	397	27.10	99.7	6.08	9.96	1469.
500	3.29	34.12	496	27.18	92.9	7.04	14.36	1471.
600	3.26	34.21	595	27.25	86.9	7.93	19.36	1472.
800	2.94	34.31	793	27.36	77.4	9.57	31.03	1475.
1000	2.74	34.38	990	27.44	71.0	11.05	44.62	1477.
1200	2.65	34.43	1188	27.48	67.7	12.44	60.15	1480.

TEMPERATURE, C



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 31

DATE 30/11/78

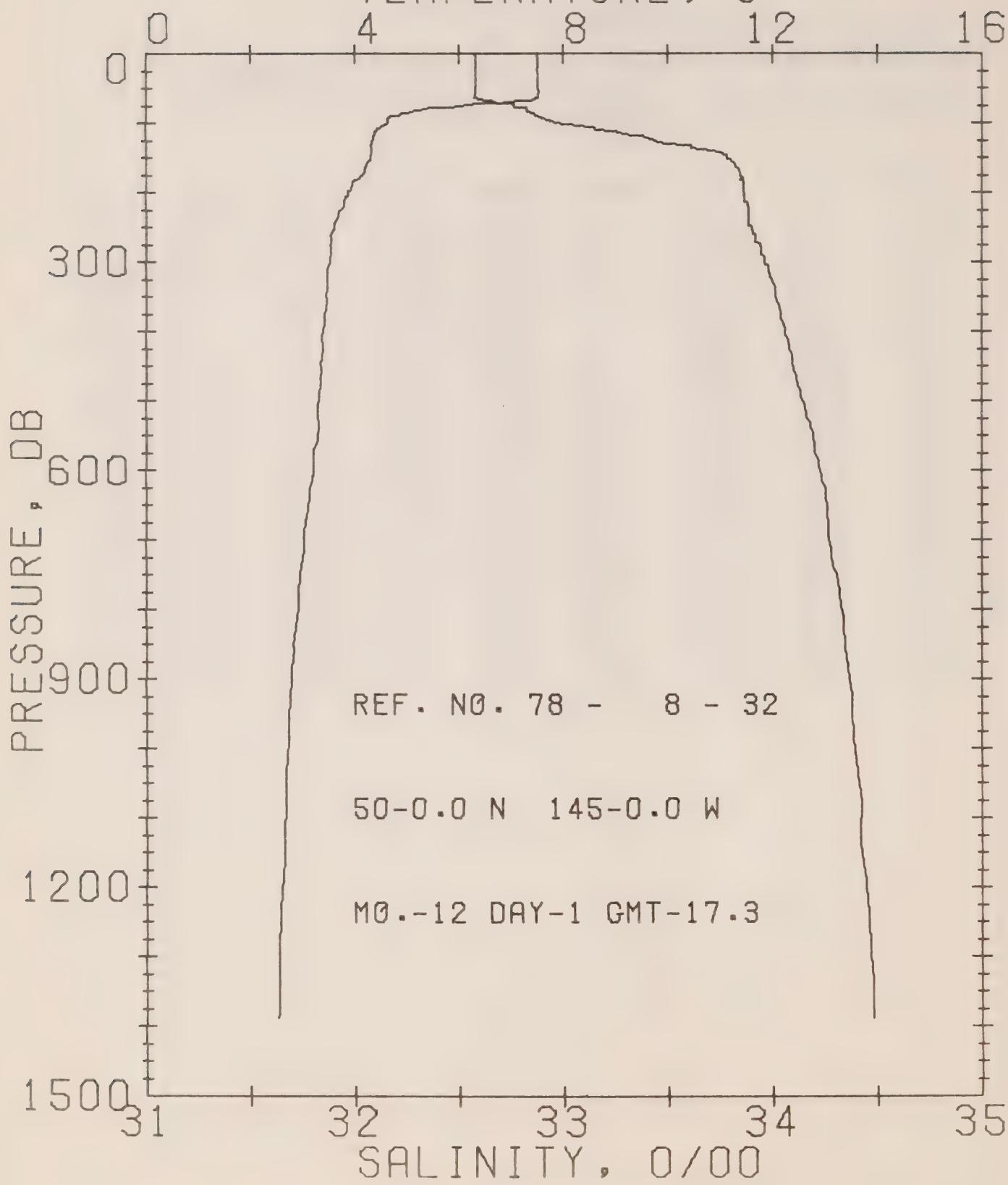
POSITION 50- .0N, 145- .0W GMT 17.2 STATION P

RESULTS OF STP CAST 258 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.51	32.59	0	25.48	251.3	.00	.00	1478.
10	7.52	32.58	10	25.47	252.3	.25	.01	1478.
20	7.52	32.58	20	25.47	252.5	.50	.05	1478.
30	7.53	32.58	30	25.47	252.7	.76	.12	1478.
50	7.56	32.58	50	25.46	253.4	1.26	.32	1479.
75	5.25	32.84	75	25.96	206.1	1.87	.71	1470.
100	4.53	33.11	99	26.25	178.4	2.35	1.14	1468.
125	4.35	33.53	124	26.61	145.2	2.76	1.60	1468.
150	4.30	33.81	149	26.83	123.9	3.09	2.06	1469.
175	4.09	33.85	174	26.89	119.0	3.39	2.56	1469.
200	3.79	33.85	199	26.92	116.2	3.69	3.12	1468.
225	3.65	33.87	223	26.95	113.5	3.97	3.75	1468.
250	3.57	33.89	248	26.97	111.4	4.25	4.43	1468.
300	3.43	33.94	298	27.02	106.6	4.80	5.96	1468.
400	3.36	34.05	397	27.12	98.2	5.83	9.61	1469.
500	3.36	34.15	496	27.20	91.6	6.78	13.96	1471.
600	3.20	34.21	595	27.26	85.9	7.66	18.93	1472.
800	2.90	34.33	793	27.38	75.6	9.27	30.34	1474.
1000	2.69	34.40	990	27.46	69.3	10.72	43.62	1477.
1200	2.57	34.45	1188	27.50	65.7	12.07	58.75	1480.

## TEMPERATURE, C



OFFSHORE OCEANOGRAPHY GROUP

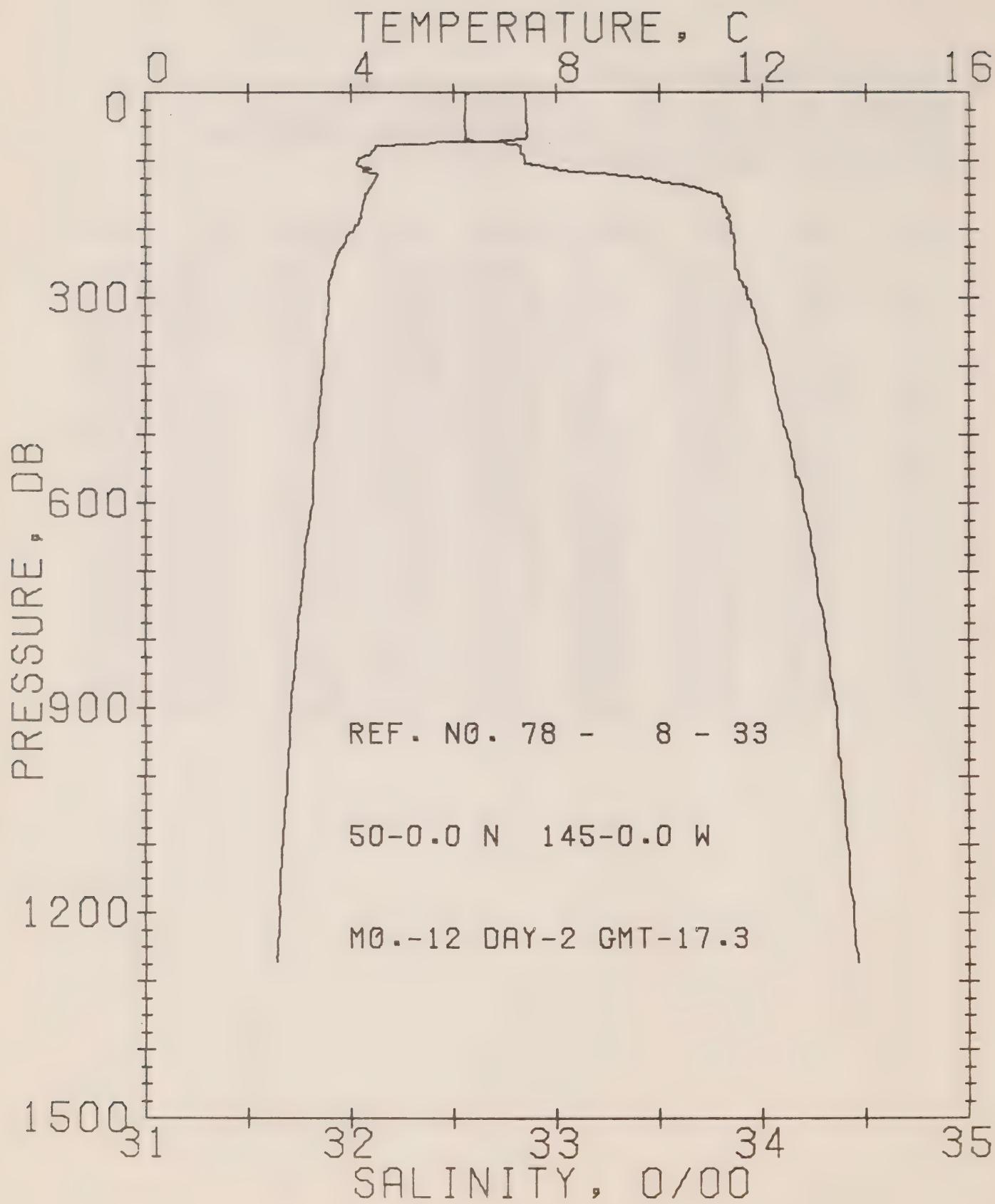
REFERENCE NO. 78- 8- 32 DATE 1/12/78

POSITION 50- .0N, 145- .0W GMT 17.3 STATION P

RESULTS OF STP CAST 262 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.50	32.58	0	25.47	251.9	.00	.00	1478.
10	7.51	32.58	10	25.47	252.2	.25	.01	1478.
20	7.51	32.58	20	25.47	252.3	.50	.05	1478.
30	7.51	32.58	30	25.47	252.5	.76	.12	1478.
50	7.53	32.58	50	25.47	253.0	1.26	.32	1479.
75	6.00	32.76	75	25.81	220.6	1.88	.71	1473.
100	4.62	32.97	99	26.13	189.8	2.39	1.16	1468.
125	4.34	33.43	124	26.52	152.8	2.81	1.64	1468.
150	4.29	33.79	149	26.81	125.6	3.15	2.12	1469.
175	4.15	33.85	174	26.88	119.6	3.45	2.63	1469.
200	3.88	33.86	199	26.92	116.0	3.75	3.19	1468.
225	3.72	33.89	223	26.95	112.7	4.03	3.81	1468.
250	3.59	33.90	248	26.98	110.8	4.31	4.49	1468.
300	3.53	33.96	298	27.03	106.1	4.85	6.00	1468.
400	3.38	34.06	397	27.12	97.9	5.87	9.62	1469.
500	3.30	34.14	496	27.19	91.8	6.82	13.97	1471.
600	3.20	34.22	595	27.27	85.2	7.70	18.91	1472.
800	2.89	34.33	793	27.38	75.2	9.30	30.29	1474.
1000	2.70	34.40	990	27.45	69.7	10.74	43.50	1477.
1200	2.60	34.45	1188	27.50	65.7	12.10	58.68	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 33 DATE 2/12/78

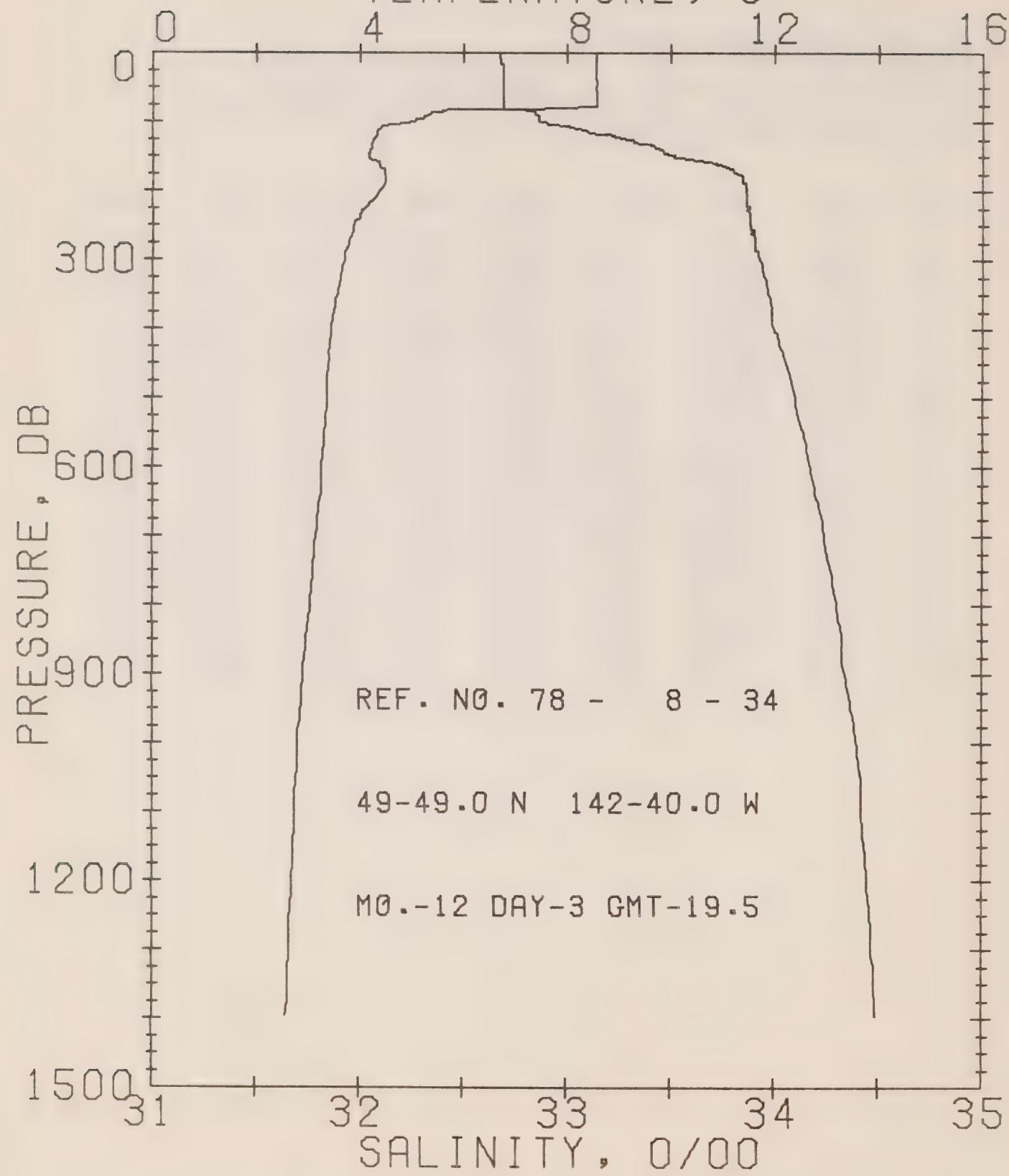
POSITION 50- .0N, 145- .0W GMT 17.3 STATION P

RESULTS OF STP CAST 230 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.38	32.57	0	25.48	251.1	.00	.00	1477.
10	7.40	32.56	10	25.47	252.3	.25	.01	1478.
20	7.41	32.56	20	25.47	252.5	.50	.05	1478.
30	7.42	32.56	30	25.46	253.1	.76	.12	1478.
50	7.43	32.55	50	25.46	253.9	1.26	.32	1478.
75	5.43	32.76	75	25.88	214.0	1.88	.72	1471.
100	4.12	32.85	99	26.09	193.8	2.38	1.16	1466.
125	4.48	33.42	124	26.51	154.4	2.83	1.67	1469.
150	4.27	33.78	149	26.82	125.5	3.18	2.15	1469.
175	4.20	33.83	174	26.86	121.9	3.48	2.67	1469.
200	4.05	33.85	199	26.89	118.8	3.78	3.24	1469.
225	3.83	33.86	223	26.92	116.0	4.08	3.87	1468.
250	3.68	33.87	248	26.94	114.0	4.36	4.57	1468.
300	3.57	33.93	298	27.00	108.8	4.92	6.12	1468.
400	3.46	34.03	397	27.09	100.7	5.96	9.84	1470.
500	3.33	34.12	496	27.17	93.9	6.94	14.30	1471.
600	3.24	34.19	595	27.24	88.1	7.84	19.37	1472.
800	2.94	34.31	793	27.36	77.4	9.48	31.05	1475.
1000	2.75	34.38	990	27.44	71.2	10.96	44.56	1477.
1200	2.60	34.44	1188	27.50	66.5	12.33	59.94	1480.

TEMPERATURE, C



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 34

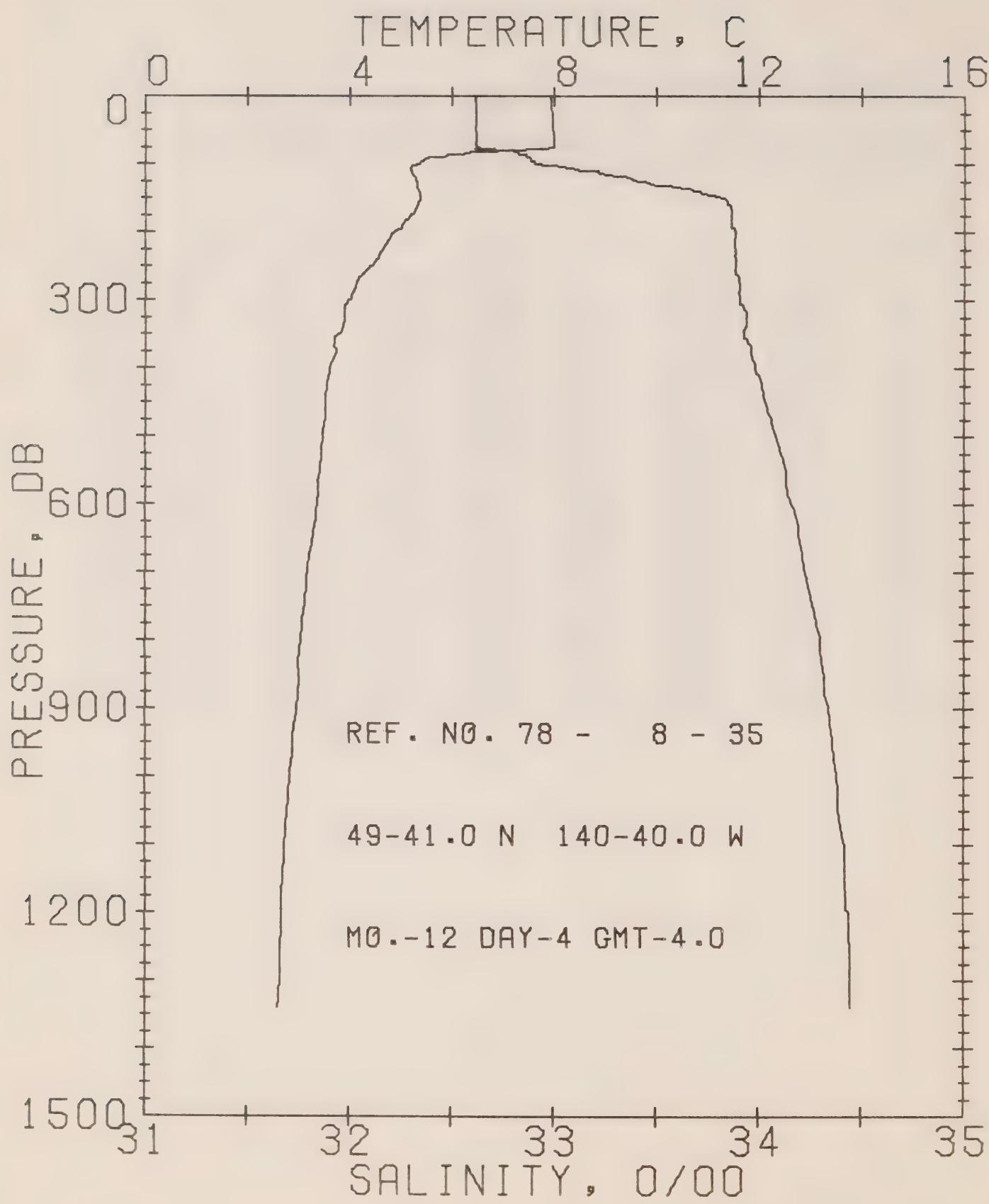
DATE 3/12/78

POSITION 49-49.0N, 142-40.0W GMT 19.5 STATION 12

RESULTS OF STP CAST 273 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.55	32.67	0	25.39	259.7	.00	.00	1482.
10	8.56	32.68	10	25.39	259.3	.26	.01	1482.
20	8.55	32.69	20	25.40	258.6	.52	.05	1482.
30	8.56	32.69	30	25.40	258.9	.78	.12	1483.
50	8.57	32.69	50	25.40	259.4	1.30	.33	1483.
75	8.60	32.69	75	25.40	260.2	1.95	.74	1483.
100	4.96	32.89	99	26.03	199.4	2.50	1.23	1470.
125	4.26	33.29	124	26.42	162.3	2.94	1.74	1468.
150	4.19	33.52	149	26.61	144.5	3.33	2.28	1468.
175	4.48	33.82	174	26.82	125.7	3.66	2.82	1470.
200	4.39	33.86	199	26.86	121.6	3.96	3.41	1470.
225	4.09	33.88	223	26.91	117.2	4.26	4.06	1469.
250	3.88	33.88	248	26.94	114.9	4.55	4.76	1469.
300	3.70	33.93	298	26.99	110.1	5.12	6.34	1469.
400	3.44	34.00	397	27.07	103.3	6.18	10.12	1470.
500	3.35	34.10	496	27.16	95.4	7.17	14.65	1471.
600	3.26	34.17	595	27.22	90.1	8.09	19.85	1472.
800	3.03	34.30	793	27.35	79.0	9.78	31.86	1475.
1000	2.80	34.40	990	27.44	70.7	11.28	45.57	1477.
1200	2.69	34.45	1188	27.50	66.7	12.65	60.96	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 35

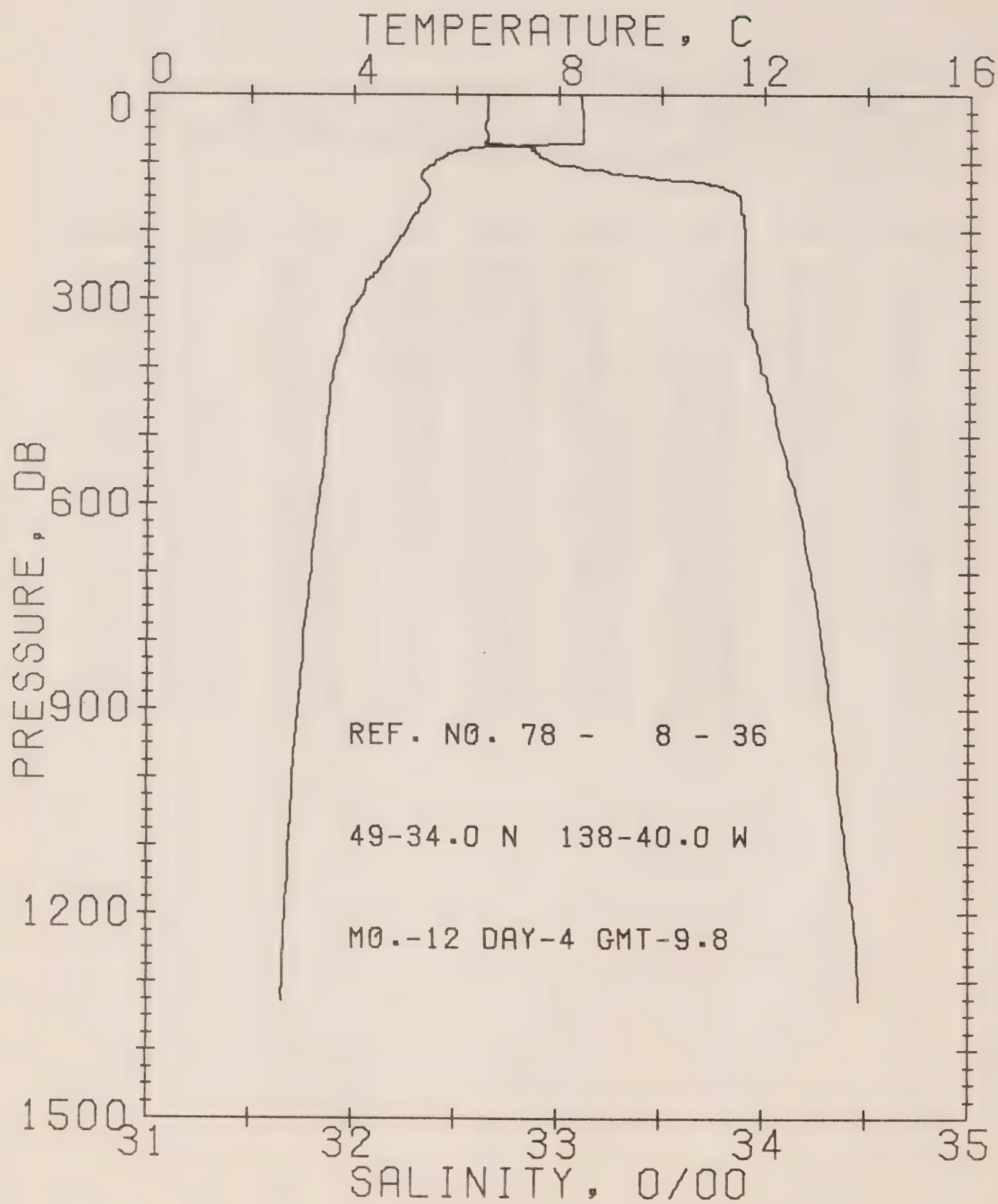
DATE 4/12/78

POSITION 49-41.0N, 140-40.0W GMT 4.0 STATION 11

RESULTS OF STP CAST 281 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.92	32.62	0	25.44	254.6	.00	.00	1480.
10	7.95	32.62	10	25.43	255.4	.26	.01	1480.
20	7.96	32.62	20	25.44	255.5	.51	.05	1480.
30	7.98	32.62	30	25.43	255.8	.77	.12	1480.
50	7.98	32.61	50	25.43	256.8	1.28	.33	1481.
75	8.01	32.62	75	25.43	257.0	1.92	.74	1481.
100	5.31	32.93	99	26.02	200.2	2.47	1.22	1471.
125	5.32	33.41	124	26.40	164.7	2.92	1.73	1472.
150	5.38	33.83	149	26.73	134.3	3.29	2.25	1473.
175	5.20	33.87	174	26.78	129.5	3.62	2.80	1473.
200	4.86	33.89	199	26.83	124.4	3.94	3.41	1472.
225	4.65	33.89	223	26.85	122.7	4.25	4.08	1472.
250	4.40	33.89	248	26.89	119.9	4.55	4.81	1471.
300	3.97	33.91	298	26.95	114.3	5.14	6.45	1470.
400	3.61	33.98	397	27.04	106.2	6.24	10.37	1470.
500	3.46	34.08	496	27.13	97.9	7.26	15.04	1471.
600	3.36	34.16	595	27.20	91.9	8.20	20.34	1473.
800	3.03	34.30	793	27.35	79.1	9.91	32.47	1475.
1000	2.84	34.38	990	27.43	72.3	11.43	46.37	1477.
1200	2.67	34.44	1188	27.49	67.2	12.82	61.96	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 36 DATE 4/12/78

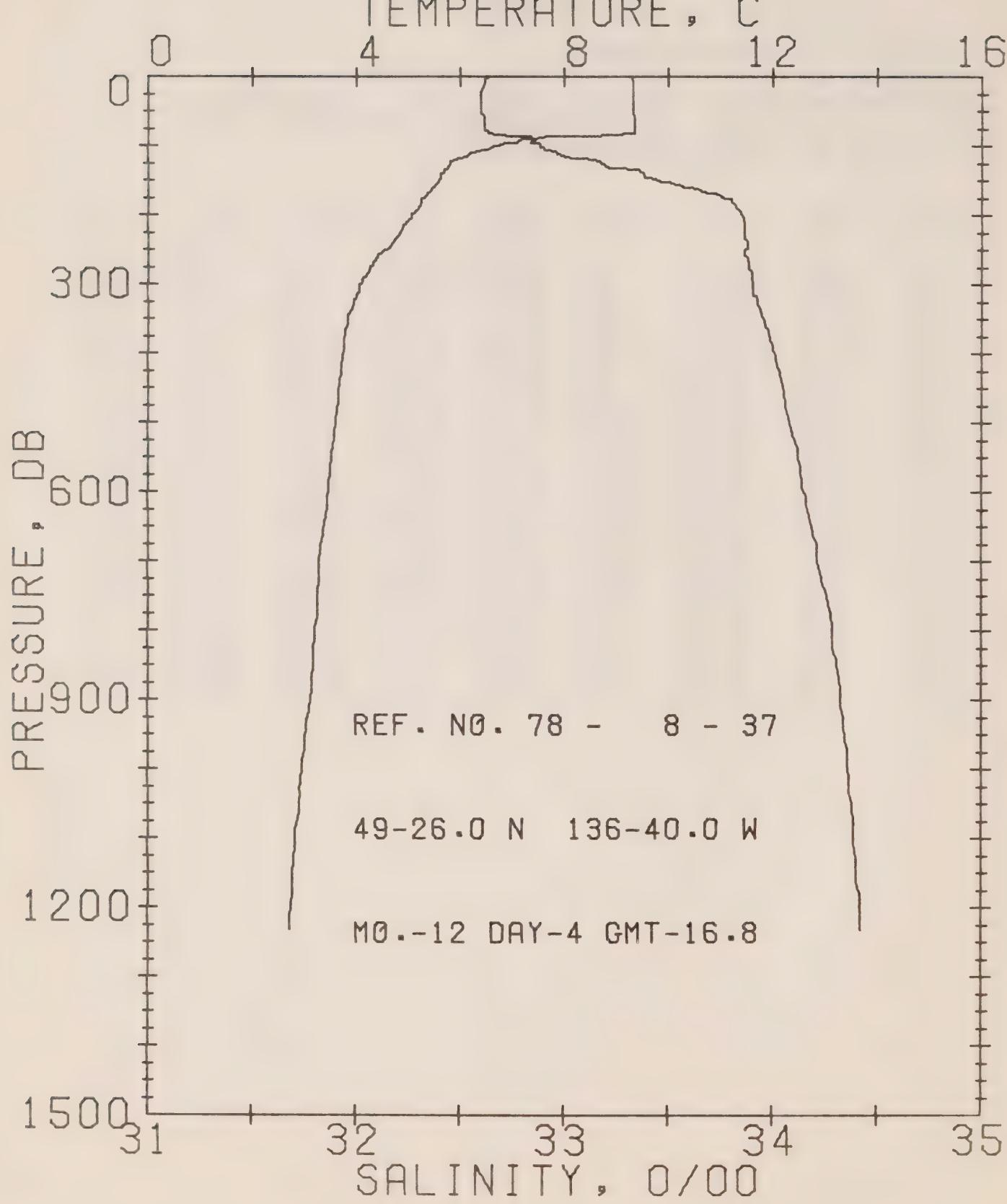
POSITION 49-34.0N, 138-40.0W GMT 9.8 STATION 10

RESULTS OF STP CAST 246 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.43	32.65	0	25.39	259.5	.00	.00	1482.
10	8.45	32.65	10	25.39	260.0	.26	.01	1482.
20	8.46	32.65	20	25.39	260.3	.52	.05	1482.
30	8.47	32.65	30	25.38	260.6	.78	.12	1482.
50	8.48	32.64	50	25.38	261.8	1.30	.33	1483.
75	6.88	32.79	75	25.72	229.2	1.95	.75	1477.
100	5.56	32.97	99	26.03	200.1	2.47	1.21	1472.
125	5.35	33.57	124	26.53	153.1	2.92	1.72	1473.
150	5.46	33.88	149	26.76	131.4	3.27	2.21	1474.
175	5.19	33.90	174	26.80	127.1	3.59	2.74	1473.
200	5.00	33.91	199	26.83	124.5	3.91	3.34	1473.
225	4.77	33.91	223	26.86	122.2	4.21	4.01	1472.
250	4.53	33.91	248	26.89	119.8	4.52	4.74	1472.
300	4.09	33.91	298	26.93	115.6	5.10	6.39	1471.
400	3.62	33.99	397	27.04	105.6	6.21	10.32	1470.
500	3.46	34.07	496	27.12	98.7	7.23	14.98	1471.
600	3.31	34.17	595	27.21	90.6	8.17	20.28	1473.
800	3.04	34.29	793	27.33	80.2	9.88	32.40	1475.
1000	2.84	34.37	990	27.42	73.1	11.40	46.40	1477.
1200	2.68	34.44	1188	27.49	67.1	12.81	62.17	1480.

TEMPERATURE, C



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 37

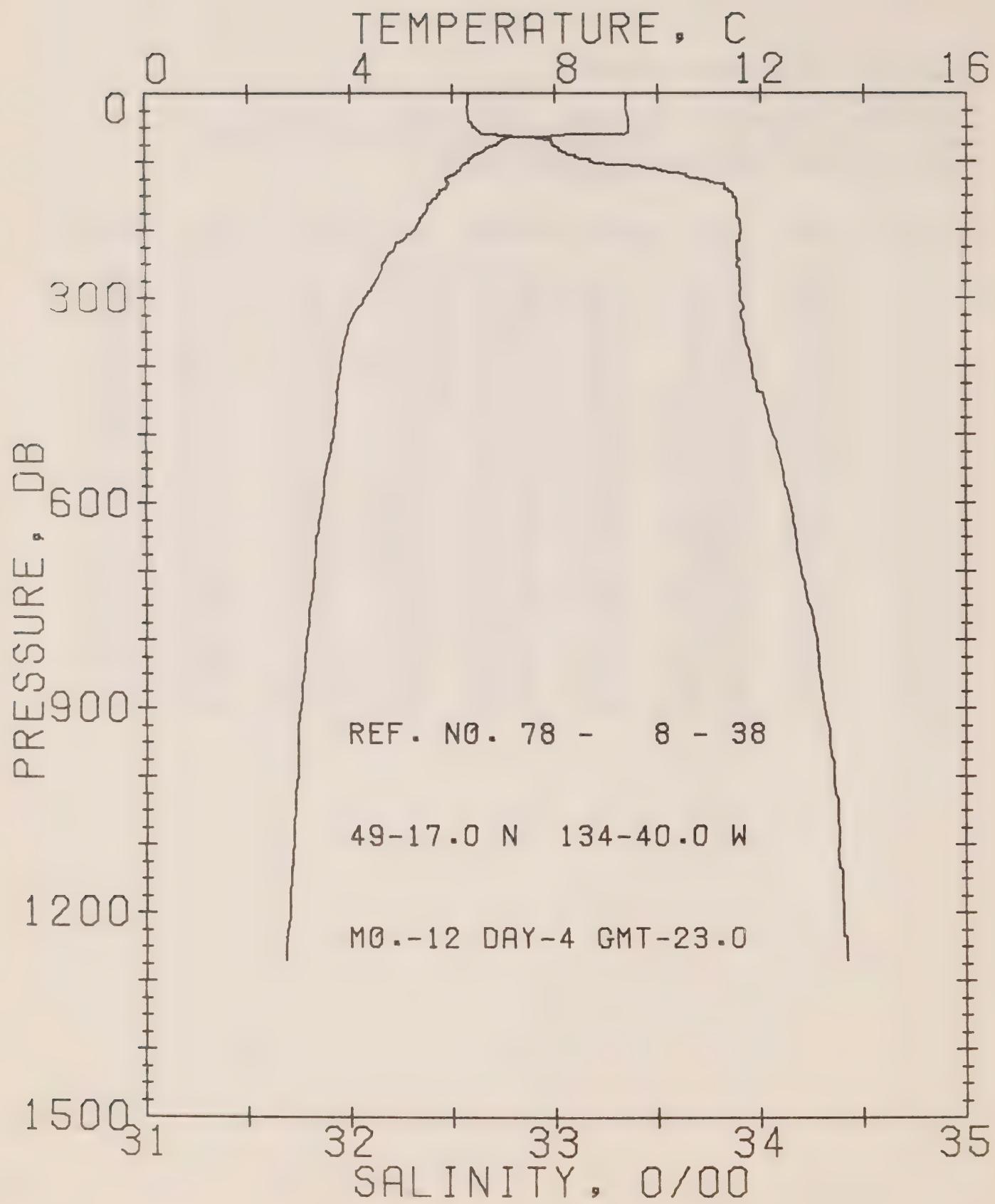
DATE 4/12/78

POSITION 49-26.0N, 136-40.0W GMT 16.8 STATION 9

RESULTS OF STP CAST 268 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.30	32.63	0	25.24	273.8	.00	.00	1485.
10	9.32	32.02	10	25.23	275.1	.27	.01	1485.
20	9.32	32.60	20	25.22	276.5	.55	.06	1485.
30	9.33	32.60	30	25.21	276.9	.83	.13	1485.
50	9.34	32.60	50	25.21	277.4	1.38	.35	1486.
75	9.37	32.61	75	25.21	277.7	2.08	.79	1486.
100	6.65	32.88	99	25.82	219.9	2.69	1.34	1477.
125	5.80	33.18	124	26.16	187.4	3.21	1.93	1474.
150	5.59	33.45	149	26.40	165.0	3.65	2.54	1474.
175	5.30	33.77	174	26.69	138.1	4.02	3.17	1473.
200	5.07	33.85	199	26.78	129.6	4.36	3.80	1473.
225	4.86	33.87	223	26.82	126.2	4.68	4.49	1473.
250	4.57	33.87	248	26.85	123.2	4.99	5.25	1472.
300	4.07	33.91	298	26.94	115.3	5.58	6.91	1471.
400	3.75	34.00	397	27.04	105.7	6.68	10.83	1471.
500	3.60	34.08	496	27.12	99.3	7.71	15.53	1472.
600	3.47	34.15	595	27.19	93.5	8.67	20.91	1473.
800	3.20	34.29	793	27.32	81.7	10.42	33.34	1476.
1000	2.95	34.36	990	27.40	75.1	11.98	47.68	1478.
1200	2.75	34.42	1188	27.47	69.5	13.42	63.84	1480.



OFFSHORE OCEANOGRAPHY GROUP

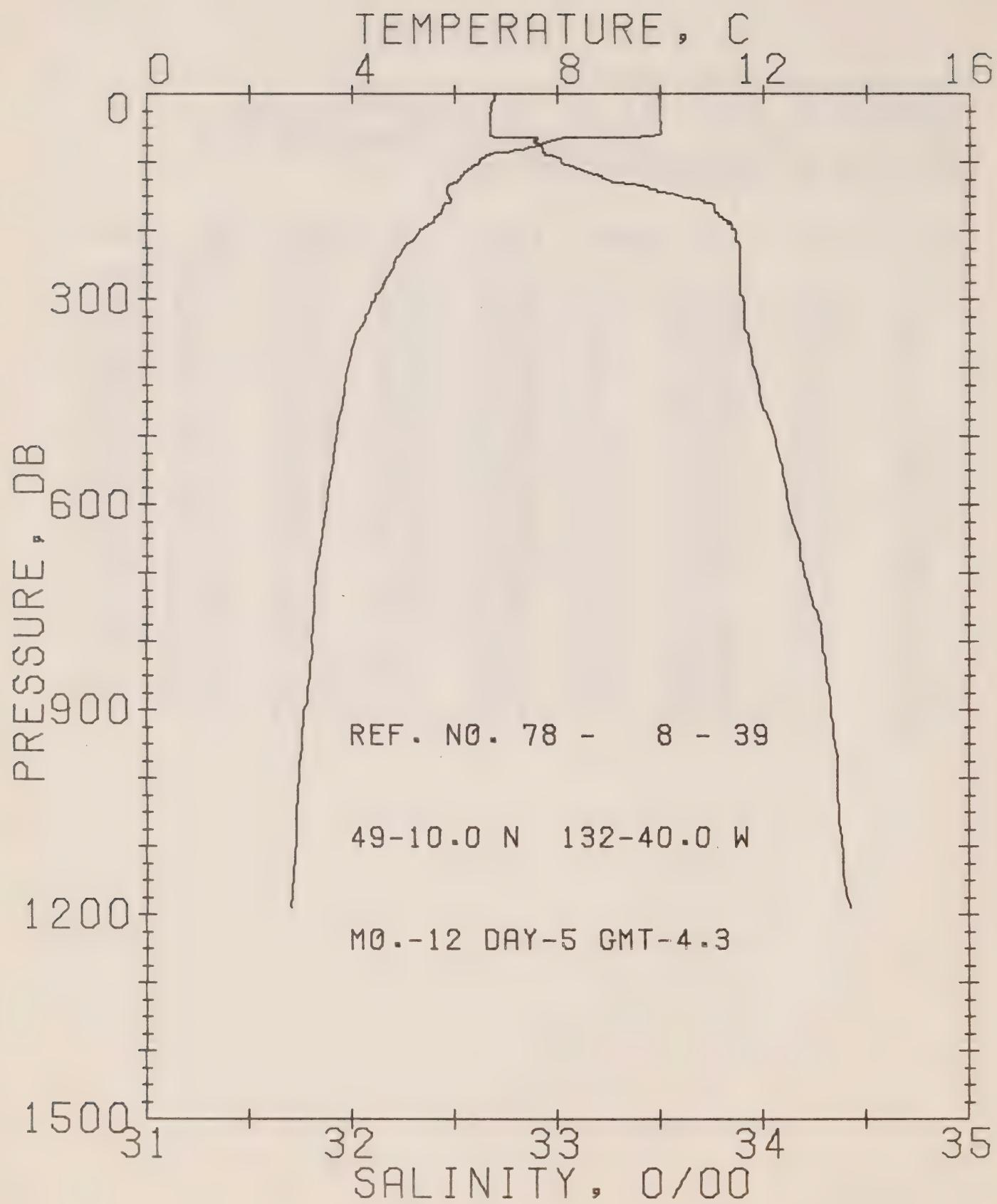
REFERENCE NO. 78- 8- 38 DATE 4/12/78

POSITION 49-17.0N, 134-40.0W GMT 23.0 STATION 8

RESULTS OF STP CAST 283 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.38	32.58	0	25.19	278.7	.00	.00	1485.
10	9.39	32.58	10	25.19	279.0	.28	.01	1485.
20	9.40	32.57	20	25.18	280.1	.56	.06	1485.
30	9.42	32.57	30	25.17	280.6	.84	.13	1486.
50	9.45	32.60	50	25.19	279.2	1.40	.36	1486.
75	6.85	32.99	75	25.88	213.9	2.01	.74	1477.
100	6.31	33.18	99	26.10	193.4	2.53	1.20	1476.
125	5.88	33.70	124	26.56	149.6	2.95	1.68	1475.
150	5.70	33.87	149	26.72	135.0	3.30	2.17	1475.
175	5.46	33.89	174	26.76	131.0	3.63	2.72	1474.
200	5.25	33.91	199	26.81	127.4	3.95	3.34	1474.
225	4.87	33.89	223	26.83	124.8	4.27	4.02	1473.
250	4.61	33.89	248	26.86	122.2	4.58	4.77	1472.
300	4.26	33.90	298	26.91	118.1	5.18	6.45	1471.
400	3.79	33.96	397	27.00	109.5	6.31	10.48	1471.
500	3.65	34.06	496	27.10	101.2	7.36	15.31	1472.
600	3.43	34.14	595	27.19	93.5	8.33	20.74	1473.
800	3.12	34.28	793	27.32	81.6	10.09	33.24	1475.
1000	2.95	34.36	990	27.40	75.0	11.65	47.55	1478.
1200	2.80	34.41	1188	27.45	70.8	13.11	63.84	1481.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 39

DATE 5/12/78

POSITION 49-10.0N, 132-40.0W GMT 4.3 STATION 7

RESULTS OF STP CAST 276 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.98	32.70	0	25.18	279.1	.00	.00	1487.
10	9.99	32.69	10	25.17	280.2	.28	.01	1488.
20	9.99	32.67	20	25.16	281.9	.56	.06	1488.
30	10.00	32.67	30	25.16	282.2	.84	.13	1488.
50	10.01	32.67	50	25.16	282.8	1.41	.36	1488.
75	7.64	32.90	75	25.70	231.1	2.06	.77	1480.
100	6.47	33.01	99	25.95	207.6	2.60	1.25	1476.
125	6.07	33.24	124	26.18	186.2	3.10	1.82	1475.
150	5.89	33.59	149	26.48	157.8	3.52	2.41	1475.
175	5.71	33.78	174	26.65	142.4	3.89	3.02	1475.
200	5.31	33.86	199	26.76	131.6	4.23	3.68	1474.
225	5.00	33.89	223	26.82	126.3	4.56	4.38	1473.
250	4.81	33.89	248	26.84	124.4	4.87	5.13	1473.
300	4.43	33.90	298	26.89	119.9	5.48	6.85	1472.
400	3.91	33.95	397	26.99	111.1	6.63	10.95	1472.
500	3.68	34.05	496	27.09	102.2	7.70	15.86	1472.
600	3.50	34.12	595	27.16	96.3	8.69	21.40	1473.
800	3.21	34.29	793	27.32	81.7	10.46	33.98	1476.
1000	2.96	34.36	990	27.40	75.1	12.03	48.28	1478.
1200	2.85	34.42	1188	27.46	70.7	13.48	64.58	1481.

90

TEMPERATURE, C

4

8

12

16

PRESSURE, DB

300

600

900

1200

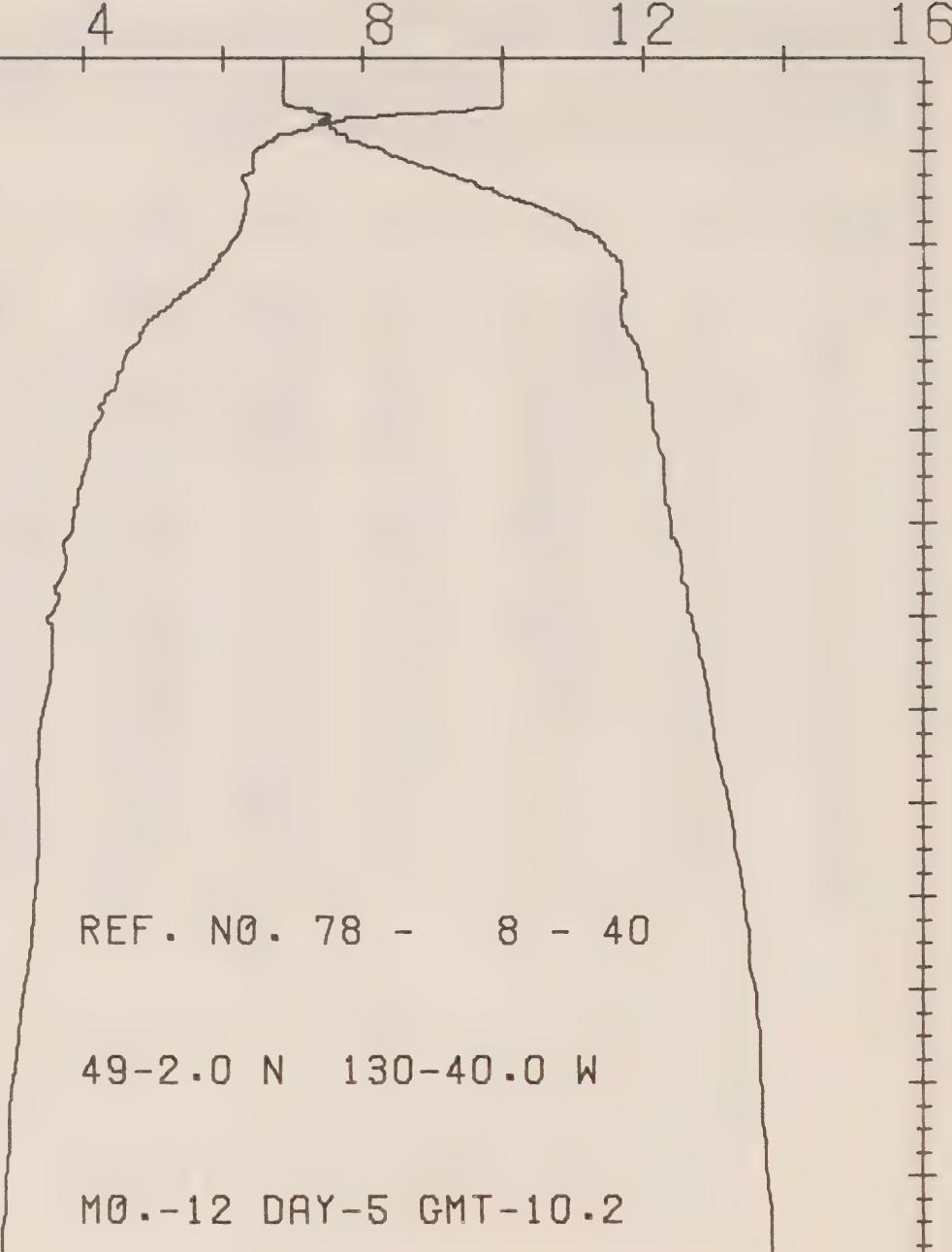
1500

SALINITY, P/PO

REF. NO. 78 - 8 - 40

49-2.0 N 130-40.0 W

MO.-12 DAY-5 GMT-10.2



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 40

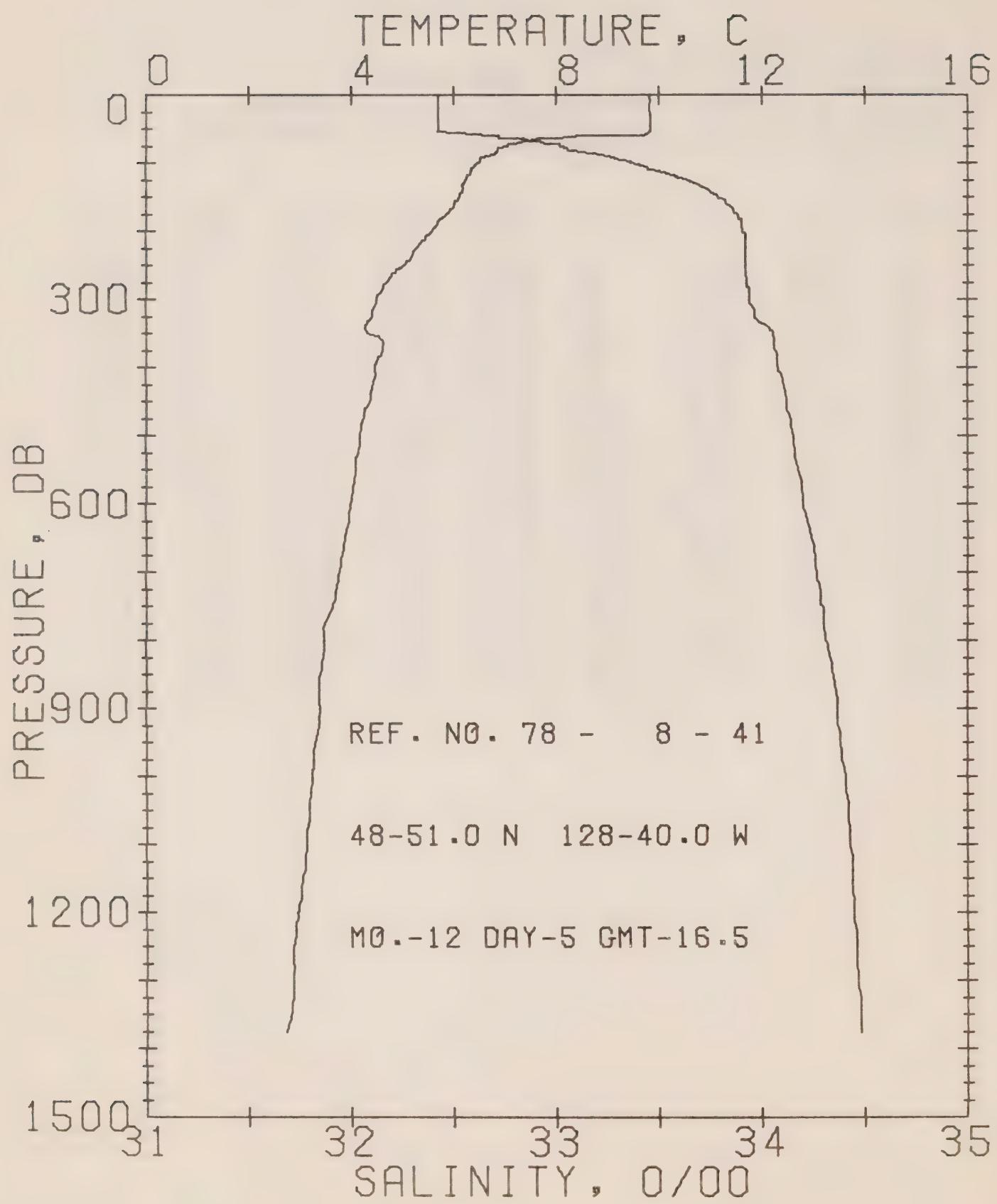
DATE 5/12/78

POSITION 49- 2.0N, 130-40.0W GMT 10.2 STATION 6

RESULTS OF STP CAST 326 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.97	32.72	0	25.20	277.5	.00	.00	1487.
10	9.99	32.72	10	25.20	278.0	.28	.01	1488.
20	9.99	32.72	20	25.20	278.2	.56	.06	1488.
30	10.01	32.72	30	25.20	278.7	.83	.13	1488.
50	9.99	32.72	50	25.20	278.8	1.39	.36	1488.
75	7.26	32.88	75	25.74	227.5	2.01	.75	1479.
100	6.45	33.08	99	26.00	202.5	2.55	1.22	1476.
125	6.37	33.30	124	26.19	185.0	3.04	1.78	1476.
150	6.36	33.52	149	26.36	169.2	3.48	2.40	1477.
175	6.28	33.74	174	26.54	152.2	3.88	3.06	1477.
200	6.10	33.86	199	26.66	141.3	4.25	3.77	1477.
225	5.87	33.93	223	26.75	133.7	4.59	4.51	1477.
250	5.49	33.93	248	26.79	129.3	4.92	5.31	1476.
300	4.82	33.96	298	26.89	119.8	5.54	7.05	1474.
400	4.13	34.03	397	27.03	107.6	6.67	11.06	1473.
500	3.84	34.10	496	27.11	100.4	7.71	15.81	1473.
600	3.50	34.17	595	27.20	92.3	8.67	21.22	1473.
800	3.35	34.31	793	27.32	82.0	10.42	33.65	1476.
1000	3.14	34.40	990	27.42	73.9	11.98	48.00	1479.
1200	2.90	34.45	1188	27.47	69.3	13.41	63.97	1481.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 41

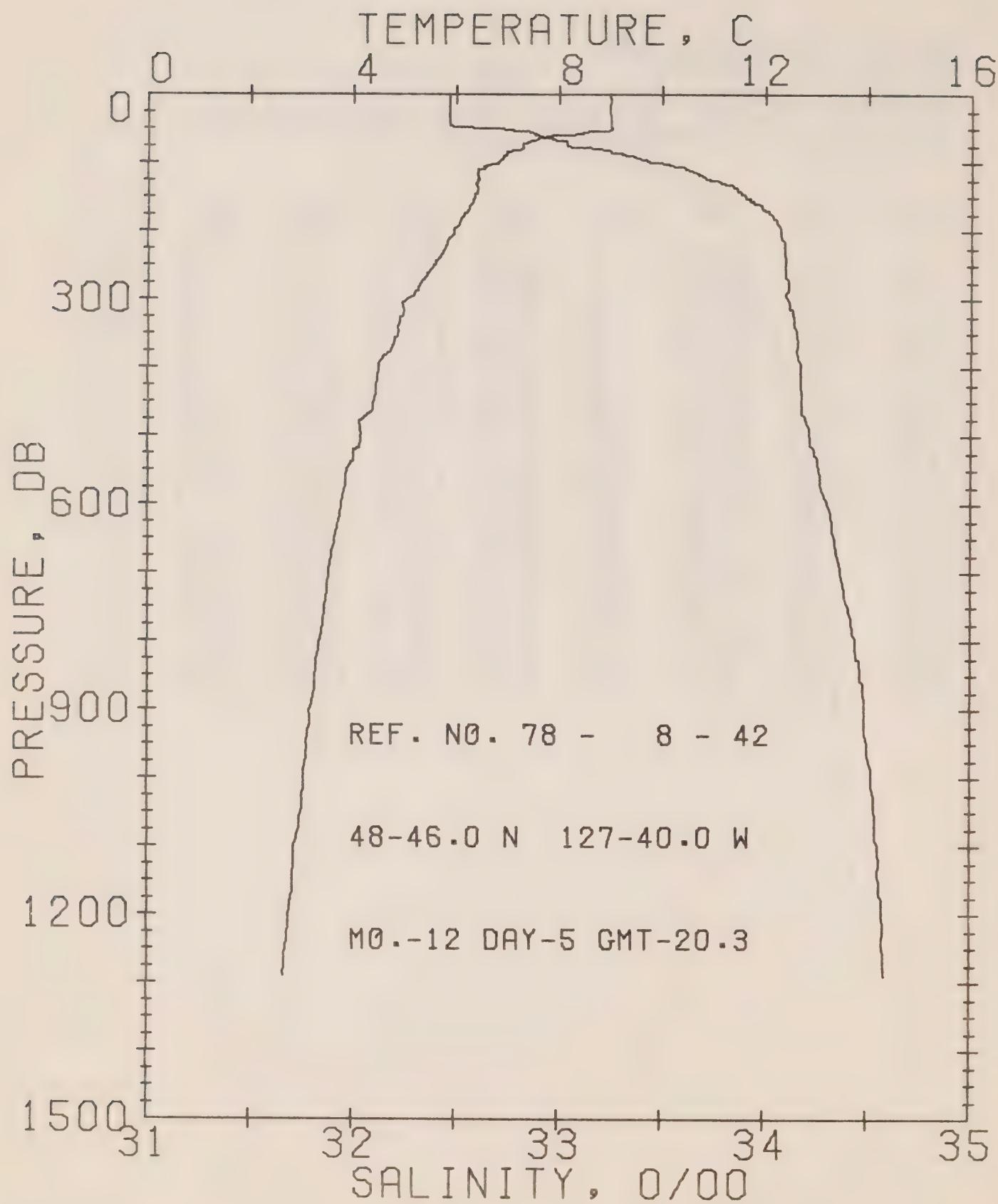
DATE 5/12/78

POSITION 48-51.0N, 128-40.0W GMT 16.5 STATION 5

RESULTS OF STP CAST 305 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.81	32.43	0	25.00	296.4	.00	.00	1486.
10	9.83	32.43	10	25.00	296.9	.30	.02	1487.
20	9.82	32.43	20	25.00	296.9	.59	.06	1487.
30	9.84	32.43	30	25.00	297.5	.89	.14	1487.
50	9.83	32.43	50	25.00	297.7	1.49	.38	1487.
75	7.05	33.02	75	25.88	214.3	2.12	.78	1478.
100	6.45	33.37	99	26.23	180.9	2.62	1.22	1476.
125	6.23	33.63	124	26.46	159.1	3.04	1.70	1476.
150	6.10	33.79	149	26.61	145.9	3.42	2.24	1476.
175	5.87	33.87	174	26.70	137.0	3.78	2.82	1476.
200	5.56	33.91	199	26.77	131.0	4.11	3.46	1475.
225	5.26	33.92	223	26.81	127.0	4.43	4.15	1474.
250	5.02	33.92	248	26.84	124.5	4.75	4.92	1474.
300	4.48	33.94	298	26.92	117.5	5.35	6.60	1472.
400	4.45	34.07	397	27.03	108.1	6.46	10.58	1474.
500	4.15	34.15	496	27.12	100.2	7.50	15.34	1475.
600	3.99	34.20	595	27.17	95.4	8.48	20.82	1476.
800	3.46	34.31	793	27.32	82.8	10.25	33.42	1477.
1000	3.23	34.41	990	27.42	74.4	11.82	47.78	1479.
1200	2.94	34.45	1188	27.47	69.5	13.26	63.93	1481.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 8- 42 DATE 5/12/78

POSITION 48-46.0N, 127-40.0W GMT 20.3 STATION 4  
RESULTS OF STP CAST 331 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.98	32.47	0	25.17	280.9	.00	.00	1483.
10	9.00	32.47	10	25.16	281.3	.28	.01	1484.
20	8.99	32.47	20	25.16	281.4	.56	.06	1484.
30	9.00	32.47	30	25.16	281.6	.84	.13	1484.
50	9.03	32.67	50	25.31	267.6	1.41	.36	1485.
75	7.29	33.03	75	25.86	216.3	1.99	.73	1479.
100	6.79	33.47	99	26.27	177.7	2.48	1.16	1478.
125	6.45	33.73	124	26.51	154.4	2.89	1.63	1477.
150	6.35	33.90	149	26.67	140.4	3.25	2.14	1477.
175	6.16	34.02	174	26.78	129.6	3.59	2.69	1477.
200	5.96	34.07	199	26.85	123.9	3.90	3.30	1477.
225	5.76	34.09	223	26.89	120.3	4.21	3.96	1477.
250	5.56	34.10	248	26.92	117.4	4.50	4.68	1476.
300	5.07	34.11	298	26.98	111.7	5.08	6.28	1475.
400	4.47	34.17	397	27.10	101.2	6.14	10.07	1474.
500	4.14	34.21	496	27.17	95.2	7.13	14.61	1475.
600	3.76	34.30	595	27.28	85.1	8.03	19.63	1475.
800	3.35	34.44	793	27.43	72.1	9.60	30.79	1476.
1000	3.04	34.52	990	27.52	64.2	10.95	43.20	1479.
1200	2.75	34.57	1188	27.59	58.4	12.18	56.92	1481.



Surface Salinity and Temperature Observations  
(P-78-8)

SURFACE SALINITY AND TEMPERATURE OBSERVATIONS  
CRUISE REFERENCE NUMBER 78- 8

DATE/TIME			SALINITY	TEMP	LONGITUDE	
YR	MO	DY	GMT	0/00	C	WEST
78	10	20	1710	31.145	9.4	123-30
78	10	20	1838	31.849	9.2	124- 0
78	10	20	2000	31.817	9.2	124-30
78	10	20	2145	31.736	9.3	125- 0
78	10	20	2300		11.0	125-33
78	10	21	20		12.0	126- 0
78	10	21	220		14.3	126-40
78	10	21	500		14.5	127-40
78	10	21	742		14.0	128-40
78	10	21	1030		13.7	129-40
78	10	21	1340	32.417	13.2	130-40
78	10	21	1725		13.9	131-40
78	10	21	2030	32.464	13.1	132-40
78	10	22	0		13.1	133-40
78	10	22	915		12.6	136-40
78	10	22	1215		12.3	137-40
78	10	22	1610	32.665	12.0	138-40
78	10	22	1920		11.5	139-40
78	10	22	2220	32.591	11.6	140-40
78	10	23	1015	32.508*	10.8	143-40
78	10	24	0	32.517	10.4	145- 0
78	10	25	0	32.510	10.0	ON STATION
78	10	26	0	32.511	10.1	ON STATION
78	10	27	0	32.536	10.1	ON STATION
78	10	28	0	32.517	9.9	ON STATION
78	10	29	0	32.536	9.9	ON STATION
78	10	30	0	32.574	9.9	ON STATION
78	10	31	0	32.525	9.5	ON STATION
78	11	1	0	32.512	9.4	ON STATION
78	11	2	0	32.604	9.6	ON STATION
78	11	3	0	32.522	9.4	ON STATION
78	11	4	0	32.557	9.4	ON STATION
78	11	5	0	32.530	9.1	ON STATION
78	11	6	0	32.524	8.9	ON STATION
78	11	7	0	32.551	9.1	ON STATION
78	11	8	0	32.529	8.9	ON STATION
78	11	9	0	32.559	8.9	ON STATION
78	11	10	0	32.530	8.8	ON STATION
78	11	11	0	32.571	8.8	ON STATION
78	11	12	0	32.534	8.8	ON STATION
78	11	13	0	32.531	8.8	ON STATION
78	11	14	0	32.531	8.7	ON STATION
78	11	15	0	32.535	8.8	ON STATION
78	11	16	0	32.539	8.8	ON STATION

SURFACE SALINITY AND TEMPERATURE OBSERVATIONS  
CRUISE REFERENCE NUMBER 78- 8

DATE/TIME			SALINITY	TEMP	LONGITUDE	
YR	MO	DY	GMT		C	WEST
78	11	17	0	32.524	8.7	ON STATION
78	11	18	0	32.527	8.7	ON STATION
78	11	19	0	32.534	8.7	ON STATION
78	11	20	0	32.527	8.7	ON STATION
78	11	21	0	32.606	8.8	ON STATION
78	11	22	0	32.603	8.4	ON STATION
78	11	23	0	32.550	8.6	ON STATION
78	11	24	0	32.537	8.6	ON STATION
78	11	25	0	32.529	8.6	ON STATION
78	11	26	0	32.517	8.7	ON STATION
78	11	27	0	32.530	8.6	ON STATION
78	11	28	0	32.520	8.5	ON STATION
78	11	29	0		8.6	ON STATION
78	11	30	0	32.535	8.4	ON STATION
78	12	1	0	32.512	8.5	ON STATION
78	12	2	0		8.6	145- 0
78	12	3	1930	32.624	9.0	142-40
78	12	4	100		9.0	141-40
78	12	4	400	32.551	8.4	140-40
78	12	4	700		9.3	139-40
78	12	4	942	32.595	8.9	138-40
78	12	4	1245		10.0	137-40
78	12	4	1600	32.527	9.8	136-40
78	12	4	1900		9.7	135-40
78	12	4	2254	32.528	9.9	134-40
78	12	5	120		10.0	133-40
78	12	5	430	32.596	11.4	132-40
78	12	5	1018	32.596	11.3	130-40
78	12	5	1620	32.340	10.3	128-40
78	12	5	2012	32.222	9.8	127-40
78	12	6	948	31.574	7.1	125- 0
78	12	6	1115	31.454	7.0	124-30
78	12	6	1310	31.769	7.1	124- 0
78	12	6	1500	31.696	7.3	123-30

\* DENOTES SALINITY SAMPLE TAKEN FROM A  
BUCKET. ALL OTHER SAMPLES TAKEN FROM  
THE SEAWATER LOOP

LIST OF OMMISIONS FROM DATA

Hydrographic data:

There were no hydrographic casts.

STD data:

There were no ommisions.





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# OCEANOGRAPHIC OBSERVATIONS AT OCEAN STATION P

1 December 1978 - 10 January 1979

VOLUME 96



INSTITUTE OF OCEAN SCIENCES, PATRICIA BAY  
Sidney, B.C.

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OCEANOGRAPHIC OBSERVATIONS AT OCEAN STATION P

1 December 1978 - 10 January 1979

VOLUME 96

Institute of Ocean Sciences, Patricia Bay

Sidney, B.C.

1979

This a manuscript which has received only limited circulation. On citing this report in a bibliography the title should be followed by the words "UNPUBLISHED MANUSCRIPT" which is in accordance with accepted bibliographic custom.

ABSTRACT

Physical, chemical and biological oceanographic observations are made from the weathership at Ocean Weather Station Papa, and between Esquimalt and Station Papa, on a routine continuing basis. Physical oceanography data only are shown, including surface observations and profiles obtained with bottle casts and conductivity-temperature-pressure instruments.



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## INTRODUCTION

Canadian operation of Ocean Weather Station P (Latitude  $50^{\circ}00'N$ , Longitude  $145^{\circ}00'W$ ) was inaugurated in December, 1950. The station is occupied primarily to make meteorological observations of the surface and upper air and to provide an air-sea rescue service. The station is manned by two vessels operated by the Marine Services Branch of the Ministry of Transport. They are the CCGS Vancouver and the CCGS Quadra. Each ship remains on station for a period of six weeks, and is then relieved by the alternate ship, thus maintaining a continuous watch.

Bathythermograph observations have been made at Station P since July, 1952. A program of more extensive oceanographic observations commenced in August 1956. This was extended in April, 1959 by the addition of a series of oceanographic stations along the route to and from Station P and Swiftsure Bank. These stations are known as Line P stations. The number of stations on Line P has been increased twice and now consists of twelve stations (Fig. 1). Bathythermograph observations and surface salinity sample collections, in addition to being made on Line P oceanographic stations, are also made at odd meridians at  $40'$ , i.e.  $139^{\circ}40'W$ ,  $141^{\circ}40'W$ , etc. These stations are known as Line P BT stations. Data observed prior to 1968 have been indexed by Collins et al (1969).

The present record includes STD and surface salinity and temperature data collected from the CCGS Quadra during the period 1 December 1978 to 10 January 1979.

All physical oceanographic data have been stored by the Marine Environmental Data Services Branch (MEDS), Department of Fisheries and Oceans, 240 Sparks Street, 7<sup>th</sup> Floor West, Ottawa, Ontario, Canada, K1A 0E6. Requests for these data should be directed to MEDS.

Biological and productivity data are published in the Manuscript Report series of the Department of Fisheries and Oceans (DFO), Pacific Biological Station, Nanaimo, British Columbia, Canada. Requests for these data should be directed to DFO.

Marine geochemical data are for the Ocean Chemistry Division, Department of Fisheries and Oceans, Institute of Ocean Sciences, P.O. Box 6000, Sidney, B.C., V8L 4B2.

PROGRAM OF OBSERVATIONS FROM CCGS QUADRA, 1 DECEMBER, 1978-10 JANUARY, 1979 (P-78-9)  
(MEDS Ref. No. 15-78-009)

Oceanographic observations were taken by the officers and crew of the CCGS Quadra.

En Route to Station P

STD casts were taken at all Line P whole stations.

Surface bucket and seawater loop samples for salinities were taken.

The surface temperature recorder and thermosalinograph were run continuously.

BT's and XBT's were taken at all whole and half Line P Stations.

On Station P

The oceanographic program was carried out as follows:

Physical Oceanography

- 1) Twelve STD casts to 1400 metres and four to 300 metres were taken.
- 2) BT's or XBT's were taken every three hours to coincide with meteorological observations, encoded and transmitted according to the IGOSS format.

Marine Geochemistry

- 1) Thirty-five air CO<sub>2</sub> samples.
- 2) Twenty-three PCO<sub>2</sub> samples.
- 3) Thirty alkalinity samples.
- 4) Thirty-five total CO<sub>2</sub> samples.
- 5) Fifty-nine nutrient samples.
- 6) Four tritium samples.

Biological Oceanography

- 1) Samples were obtained from 150 metre vertical plankton hauls.

### En Route from Station P

STD casts were taken at all Line P whole stations.

Surface bucket or seawater loop samples for salinity were taken.

The surface temperature recorder and thermosalinograph were run continuously.

BT's or XBT's were taken at all Line P whole and half stations.

### Observations for Other Agencies

- 1) Marine mammal observations were made by the ship's officers for Mr. I. McAskie, Department of Fisheries and Oceans, Pacific Biological Station, Nanaimo, B.C., Canada.
- 2) Bird observations were made by the ship's officers for Dr. M. Myres, University of Alberta, Calgary, Alberta, Canada and Mr. J. Guiget, Curator of Birds and Mammals, Provincial Museum, Department of Provincial Secretary and Travel Industry, Victoria, British Columbia, Canada.
- 3) Air CO<sub>2</sub> samples were taken weekly in duplicate for Scripps Institution of Oceanography, La Jolla, California, U.S.A.

Data were processed for publication by Interact Computing Services Ltd., Victoria, B.C., Canada.

### OBSERVATIONAL PROCEDURES

The daily surface water temperatures were measured from a bucket sample using a deck thermometer of  $\pm 0.1^{\circ}\text{C}$  accuracy. The daily surface salinity samples were obtained from the seawater loop. When the seawater loop was not operational these samples were obtained with a bucket, and are indicated with a '\*' in this data record.

Salinity determinations were made ashore with a Guildline Autosal salinometer. Accuracy using duplicate determinations is estimated to be  $\pm 0.003\%$ .

Line P engine intake continuous temperature on both ships was recorded by a Honeywell Electronik 15 Recorder. The temperature probe is at a depth of approximately 3 metres below the sea surface and the instrument accuracy is believed to be  $\pm 0.1^{\circ}\text{C}$ .

Each ship is equipped with a Plessey Model 6600-T thermosalinograph which is used, on Line P, for continuous recording of surface temperature and salinities from the ship's seawater loop. The temperature probe is mounted at the seawater loop intake (approximately 3 metres below the surface) and the salinity probe and recorder are situated in the dry lab. The accuracy

of this instrument is believed to be  $\pm 0.1^{\circ}\text{C}$  for temperature and  $\pm 0.1^{\circ}/\text{oo}$  for salinity.

STD profiles were taken with a Guildline Model 8700 STP system.

### COMPUTATIONS

Analog traces from the salinity-temperature-pressure instrument have been digitized using a Hewlett-Packard (HP) 9821A calculator and an HP 9864A digitizer, then replotted by a HP 9862A plotter. Digitization was continued until original and computer plotted traces were coincident.

The HP 9821A was then connected to a HP 2116 minicomputer and the digitized data transferred to 9-track tape. Using a UNIVAC 1106 computer the data was listed and obvious spikes removed, then a correction was applied.

Generally the correction is determined by comparison with hydrographic casts of the same cruise. As no hydrographic casts were taken, the STD data was compared with hydrographic casts, taken at Station P, from the earlier part of cruise 79002. Also a comparison was made with the mean of all hydrographic cast data taken at Station P, during the month of December, between 1956 and 1976. Due to the manner in which the correction was determined no estimate of error is given.

Correction applied to STD data to produce data in this report:

PRESS	TEMP	SAL
0db	$-0.67^{\circ}\text{C}$	$+0.13^{\circ}/\text{oo}$
1200db	$-0.13^{\circ}\text{C}$	$+0.59^{\circ}/\text{oo}$

For other pressures linear interpolation was used.

Temperature and salinity values were listed at standard pressures and plotted using a Calcomp 565 offline plotter.

Data values which we suspect but which we have included in this data record are indicated with a plus. These data have been removed from magnetic tape records.

The headings for the data listings are explained as follows:

PRESS	is pressure
TEMP	is temperature (degrees Celsius)
SAL	is salinity (parts per thousand)
DEPTH	is reported in metres
SIGMA-T	is specific gravity anomaly
SVA	is specific volume anomaly
THETA	is potential temperature (degrees Celsius)
SVA (THETA)	is potential specific volume anomaly

DELTA D        is geopotential anomaly (J/kg)  
POT EN        is potential energy in units of  $10^8$  ergs/cm<sup>2</sup>  
SOUND        is the velocity of sound in m/sec

#### REFERENCES

Carpenter, J.H., 1965. The Chesapeake Bay Institute technique for the Winkler dissolved oxygen method. Limnol. and Oceanogr. 10, 141-143.

Collins, C.A., R.L. Tripe, D.A. Healey and J. Joergensen, 1969. The time distribution of serial oceanographic data from the Ocean Station P programme. Fish. Res. Bd. Can. Tech. Rept. No. 106.

MacNeill, M., 1977. A study of anomalous salinity and oxygen values in the deep water at Ocean Station P from 1960-1976 (unpublished manuscript) Pacific Marine Science Report 77-9.

Reiniger, R.F. and C.K. Ross, 1968. A method of interpolation with application to oceanographic data. Deep Sea Res. 15, 186-193.

U.S.N. Hydrographic Office, 1955. Instruction Manual of Oceanographic Observations. Publ. No. 607.

## LOG OF STD OBSERVATIONS

Consec #	Station	Date (Z)	Time (Z)	STD (m)	Hydrocast (m)	Comments
001	1	01/12/78	2330	120		
002	2	02/12/78	0130	150		
003	3	02/12/78	0400	1200		
004	4	02/12/78	0730	1400		
005	5	02/12/78	1030	1400		
006	6	02/12/78	1630	1400		
007	7	02/12/78	2200	1400		
008	8	03/12/78	0430	1400		
009	9	03/12/78	1030	1400		
010	10	03/12/78	1710	1400		
011	11	04/12/78	0000	1400		
012	12	04/12/78	0600	300		
013	P	04/12/78	1700	1400		
014	P	05/12/78	1730	1400		
015	P	09/12/78	1730	1400		
016	P	20/12/78	1730	300		
022	P	22/12/78	1730	300		
023	P	24/12/78	1730	1400		
024	P	25/12/78	1700	1400		
025	P	26/12/78	1700	1400		
026	P	27/12/78	1700	1400		
027	P	29/12/78	1600	300		
033	P	30/12/78	1700	1400		
034	P	31/12/78	1700	1400		
035	P	01/01/79	1700	1400		
036	P	04/01/79	1700	1400		
037	P	05/01/79	1700	1400		
038	P	06/01/79	1600	300		
044	12	07/01/79	2010	1400		
045	11	08/01/79	0210	1400		
046	10	08/01/79	0740	1400		
047	9	08/01/79	1320	1400		
048	8	08/01/79	1900	1400		
049	7	09/01/79	0100	1400		
050	6	09/01/79	0830	1400		
051	5	09/10/79	1720	1400		
052	4	10/01/79	0110	300		
053	3	10/01/79	0530	300		
054	2	10/01/79	0850	105		
055	1	10/01/79	1035	105		

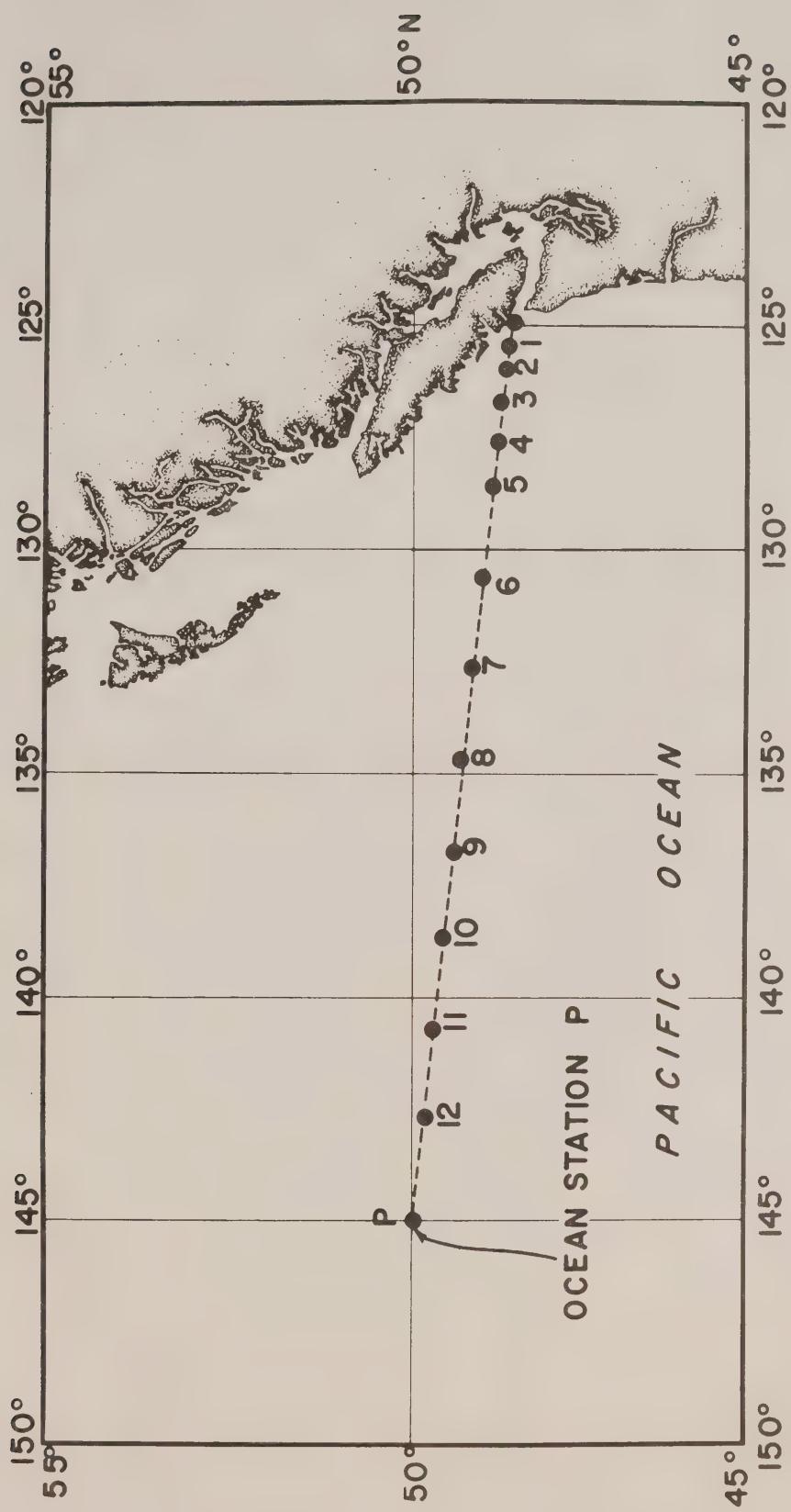


Fig. 1 Chart showing Line P station positions.

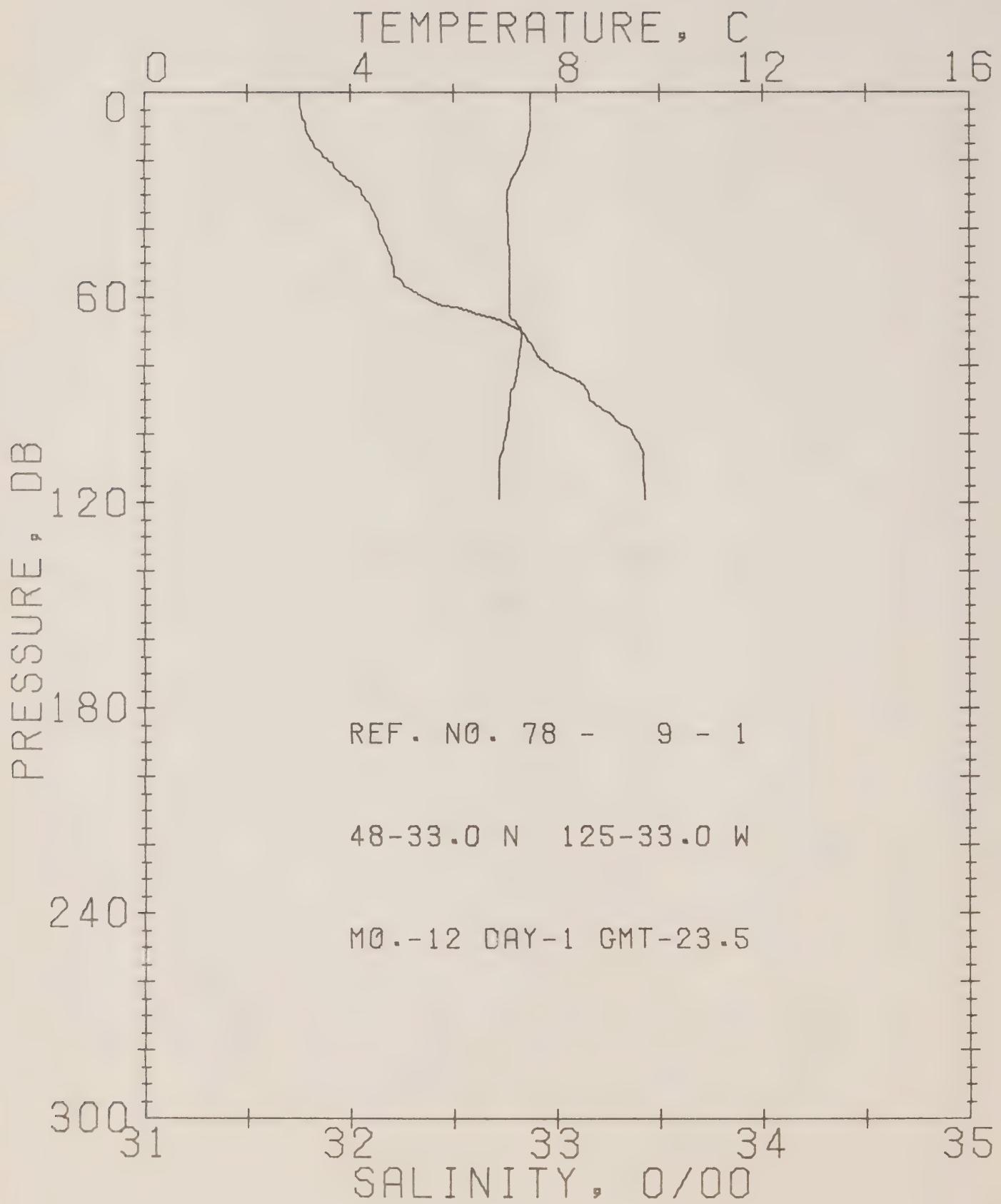


Oceanographic Data Obtained on Cruise P-78-9  
(MEDS Reference No. 15-78-009)



Results of STD Observations

(P-78-9)



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 1

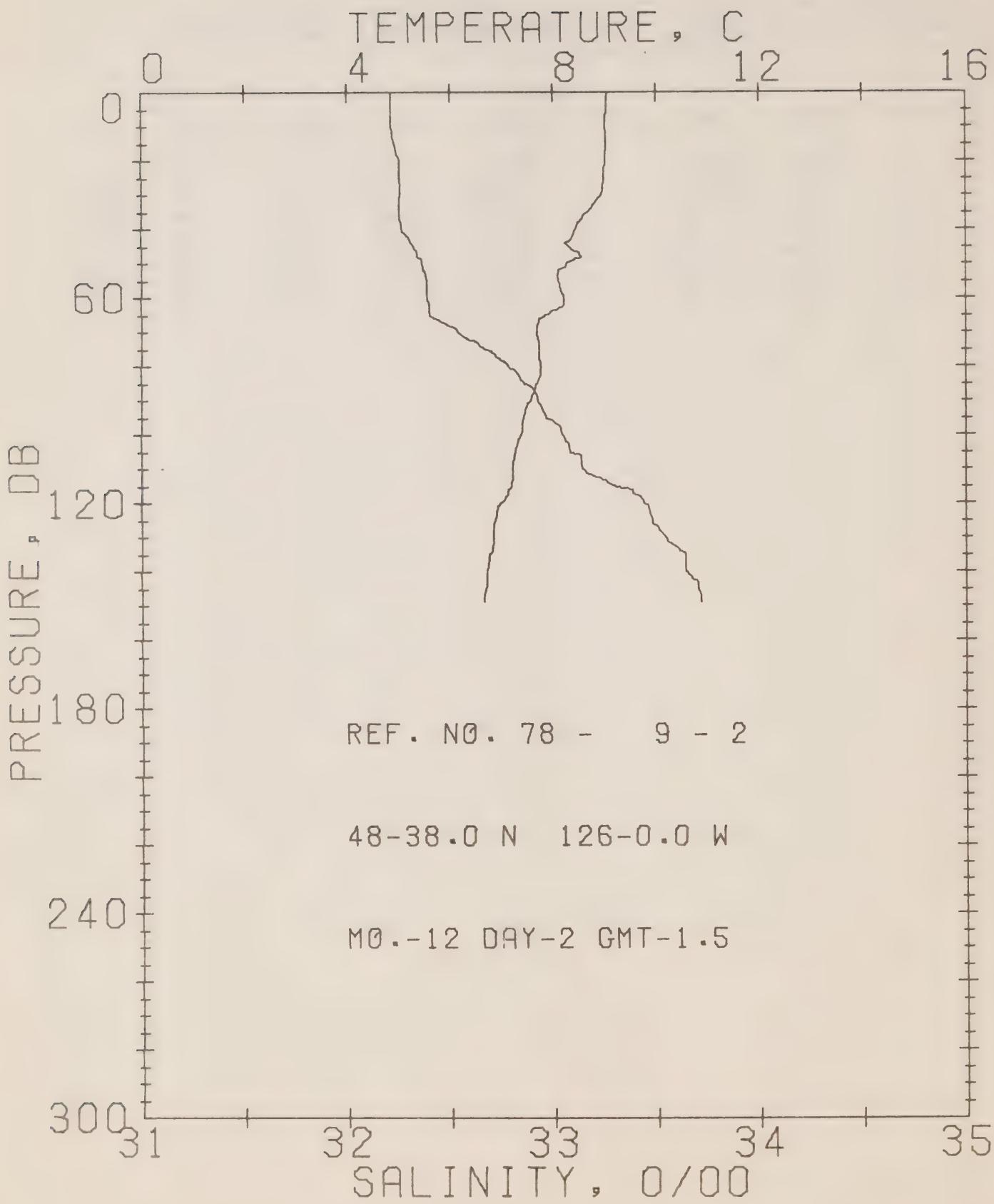
DATE 1/12/78

POSITION 48-33.0N, 125-33.0W GMT 23.5 STATION 1

RESULTS OF STP CAST 84 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.49	31.75	0	24.82	313.7	.00	.00	1477.
10	7.48	31.78	10	24.85	311.4	.31	.02	1477.
20	7.31	31.89	20	24.96	301.1	.62	.06	1477.
30	7.05	32.05	30	25.12	286.0	.91	.14	1476.
50	7.08	32.20	50	25.23	275.4	1.47	.37	1477.
75	7.28	32.89	75	25.74	227.0	2.11	.76	1479.
100	7.00	33.37	99	26.16	187.9	2.62	1.23	1479.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 2 DATE 2/12/78

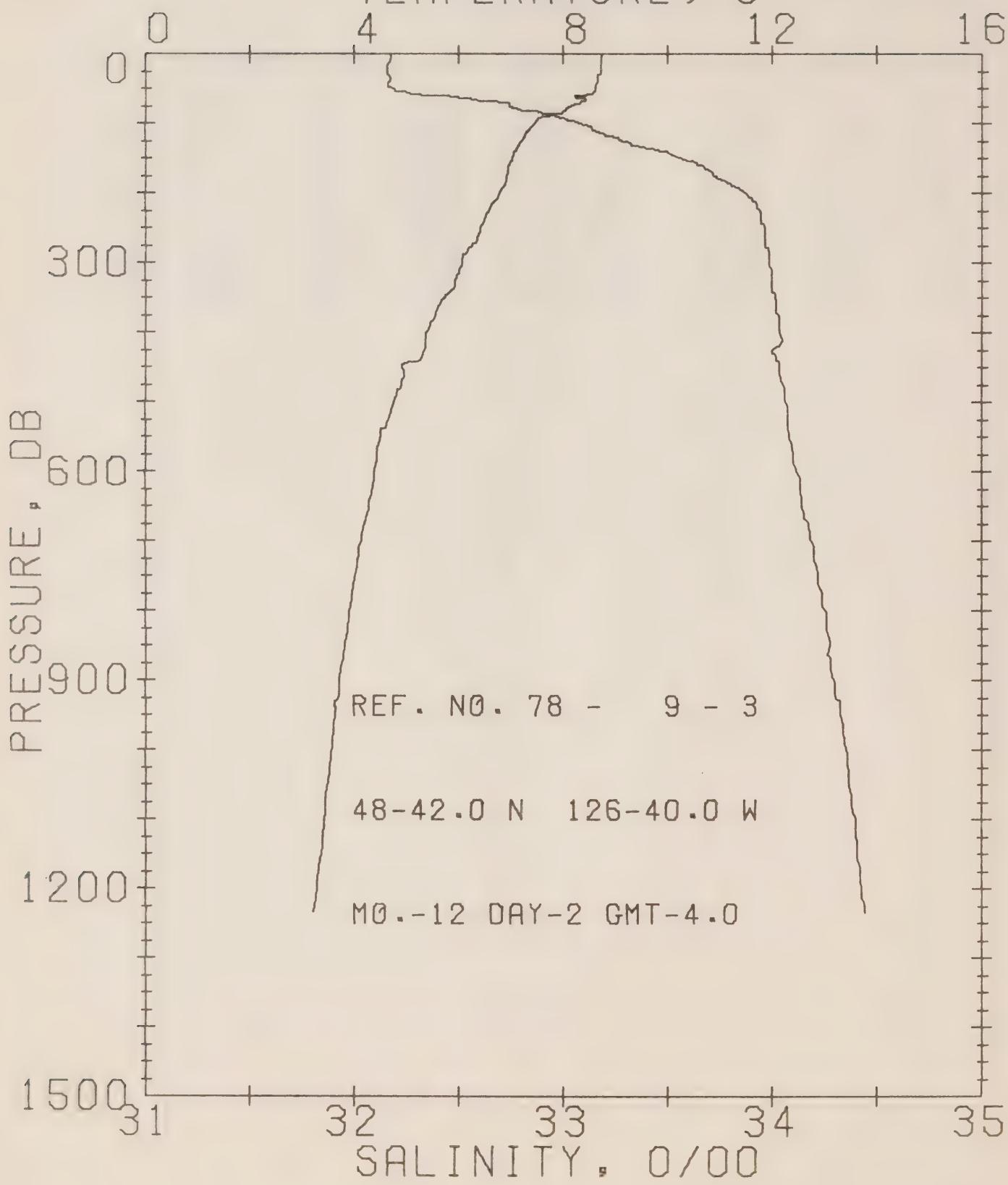
POSITION 48-38.0N, 126- .0W GMT 1.5 STATION 2

RESULTS OF STP CAST 114 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.06	32.21	0	24.95	301.3	.00	.00	1483.
10	9.02	32.21	10	24.96	300.8	.30	.02	1483.
20	9.00	32.25	20	24.99	297.8	.60	.06	1483.
30	8.93	32.26	30	25.01	296.2	.90	.14	1483.
50	8.27	32.36	50	25.19	279.6	1.48	.37	1481.
75	7.73	32.67	75	25.51	249.3	2.15	.80	1480.
100	7.36	33.04	99	25.85	217.2	2.73	1.31	1480.
125	6.85	33.48	124	26.27	178.1	3.22	1.88	1478.
150	6.65	33.71	149	26.47	158.8	3.65	2.47	1478.

TEMPERATURE, C



## OFFSHORE OCEANOGRAPHY GROUP

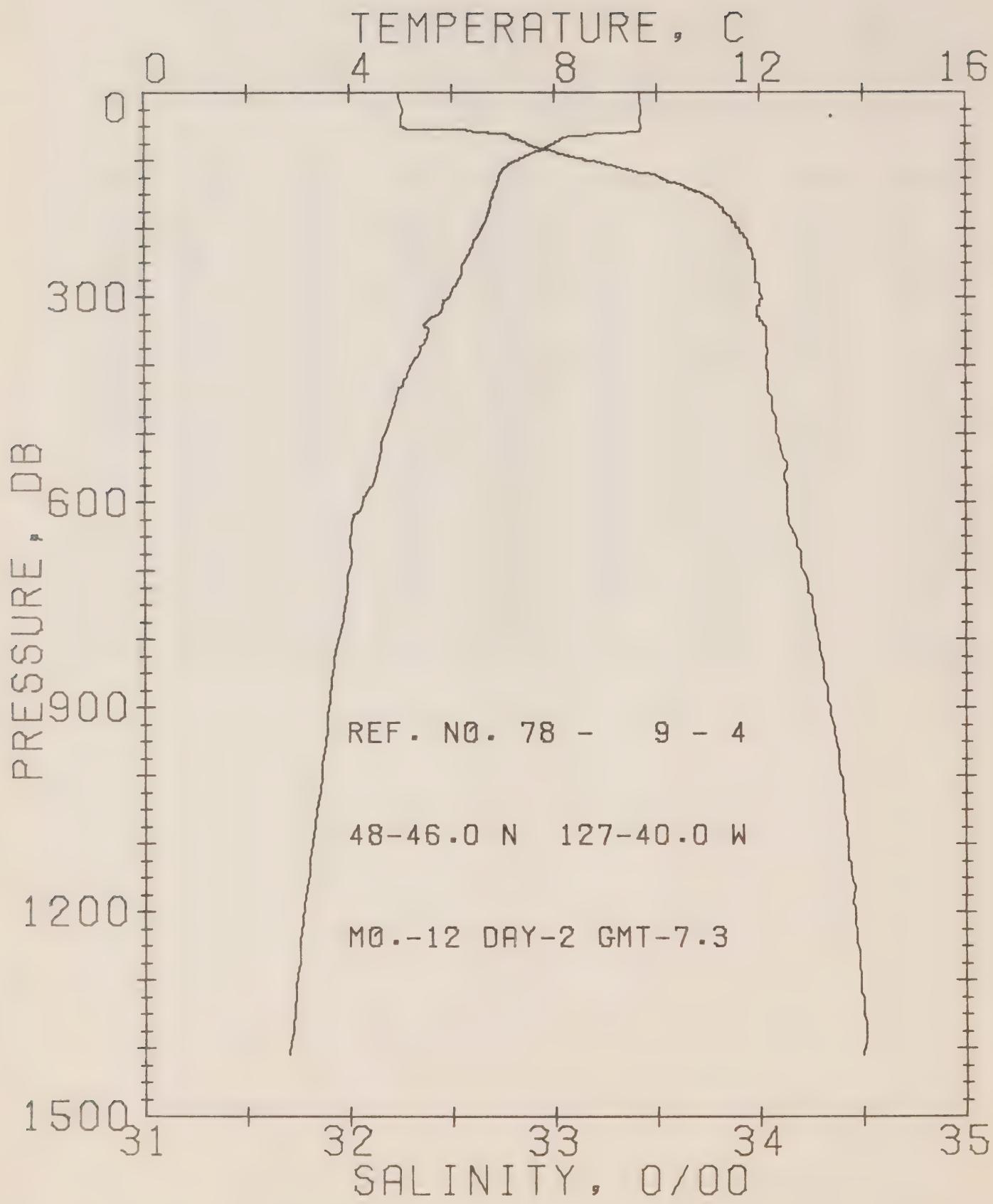
REFERENCE NO. 78- 9- 3 DATE 2/12/78

POSITION 48-42.0N, 126-40.0W GMT 4.0 STATION 3

RESULTS OF STP CAST 358 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.74	32.17	0	24.97	299.6	.00	.00	1482.
10	8.71	32.17	10	24.97	299.4	.30	.02	1482.
20	8.72	32.16	20	24.96	300.4	.60	.06	1482.
30	8.69	32.16	30	24.97	300.1	.90	.14	1482.
50	8.62	32.18	50	24.99	298.1	1.50	.38	1482.
75	8.12	32.74	75	25.51	249.6	2.18	.82	1482.
100	7.43	33.08	99	25.87	215.2	2.76	1.33	1480.
125	7.18	33.28	124	26.06	197.4	3.28	1.92	1480.
150	7.01	33.55	149	26.30	175.1	3.74	2.57	1480.
175	6.92	33.72	174	26.44	161.9	4.16	3.26	1480.
200	6.76	33.86	199	26.58	149.4	4.55	4.00	1480.
225	6.57	33.94	223	26.66	141.7	4.91	4.79	1480.
250	6.39	33.97	248	26.71	137.4	5.26	5.63	1479.
300	6.04	33.99	298	26.77	132.2	5.94	7.53	1479.
400	5.38	34.03	397	26.88	122.2	7.21	12.06	1478.
500	4.74	34.06	496	26.98	113.4	8.39	17.49	1477.
600	4.38	34.11	595	27.06	106.2	9.49	23.64	1477.
800	3.91	34.26	793	27.23	92.0	11.47	37.74	1479.
1000	3.56	34.36	991	27.34	82.2	13.22	53.73	1481.
1200	3.27	34.43	1188	27.43	74.7	14.79	71.32	1483.



## OFFSHORE OCEANOGRAPHY GROUP

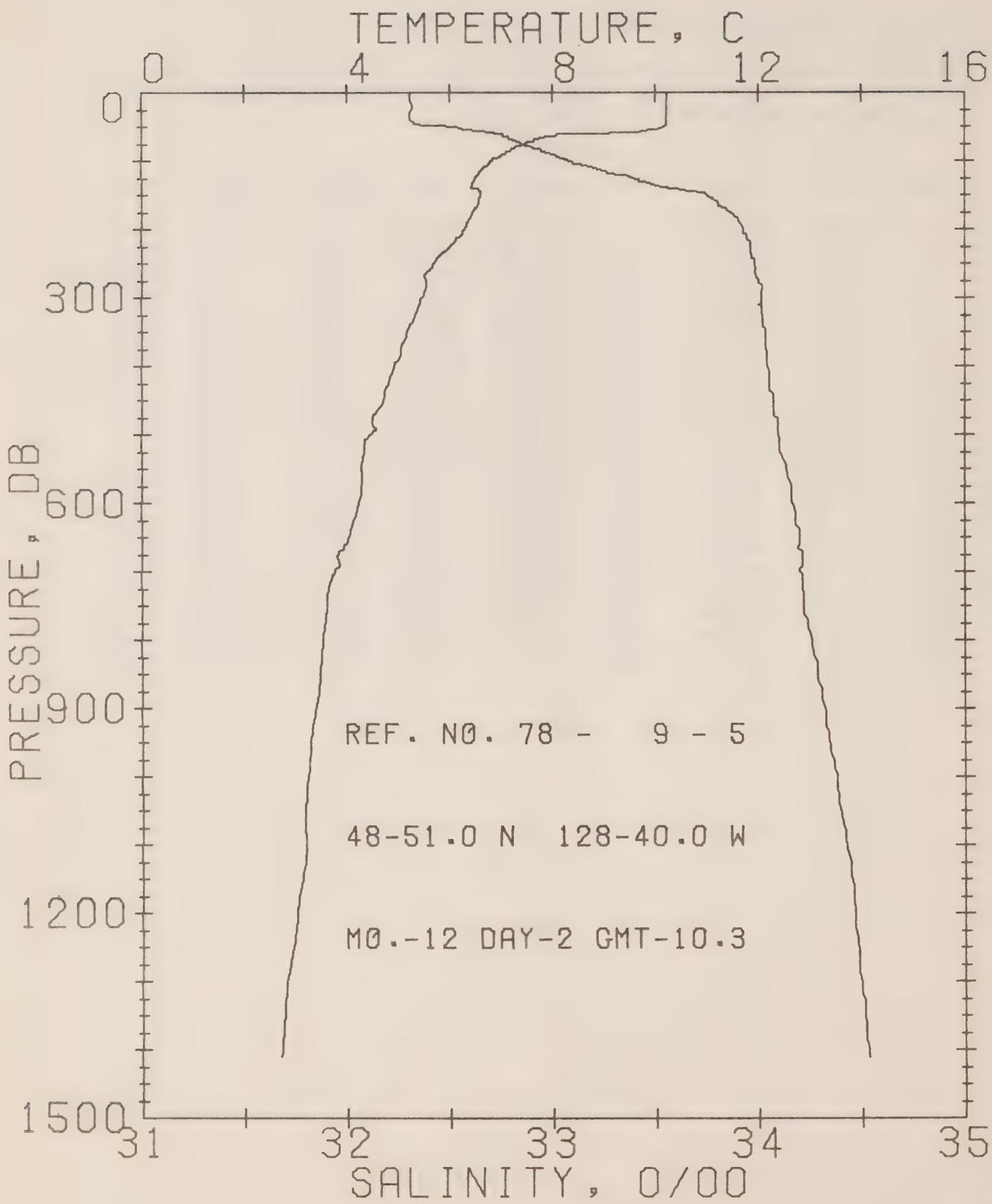
REFERENCE NO. 78- 9- 4 DATE 2/12/78

POSITION 48-46.0N, 127-40.0W GMT 7.3 STATION 4

RESULTS OF STP CAST 316 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.67	32.24	0	24.88	308.3	.00	.00	1486.
10	9.67	32.24	10	24.88	308.5	.31	.02	1486.
20	9.69	32.25	20	24.88	308.0	.62	.06	1486.
30	9.70	32.26	30	24.89	308.0	.92	.14	1486.
50	9.70	32.25	50	24.88	309.0	1.54	.39	1487.
75	7.94	32.87	75	25.63	237.4	2.20	.81	1481.
100	7.23	33.17	99	25.97	205.8	2.76	1.31	1479.
125	6.91	33.52	124	26.29	175.9	3.23	1.85	1479.
150	6.80	33.72	149	26.47	159.5	3.65	2.44	1479.
175	6.71	33.83	174	26.56	151.0	4.04	3.08	1479.
200	6.57	33.89	199	26.63	144.7	4.41	3.78	1479.
225	6.39	33.95	223	26.69	138.8	4.76	4.55	1479.
250	6.22	33.98	248	26.74	134.5	5.11	5.37	1479.
300	5.94	34.01	298	26.80	129.3	5.77	7.23	1478.
400	5.19	34.03	397	26.91	119.9	7.01	11.66	1477.
500	4.68	34.08	496	27.01	111.1	8.16	16.93	1477.
600	4.26	34.13	595	27.09	103.6	9.23	22.92	1477.
800	3.76	34.28	793	27.26	88.3	11.14	36.49	1478.
1000	3.44	34.39	991	27.38	78.1	12.80	51.66	1480.
1200	3.08	34.46	1188	27.47	70.4	14.28	68.24	1482.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 5

DATE 2/12/78

POSITION 48-51.0N, 128-40.0W

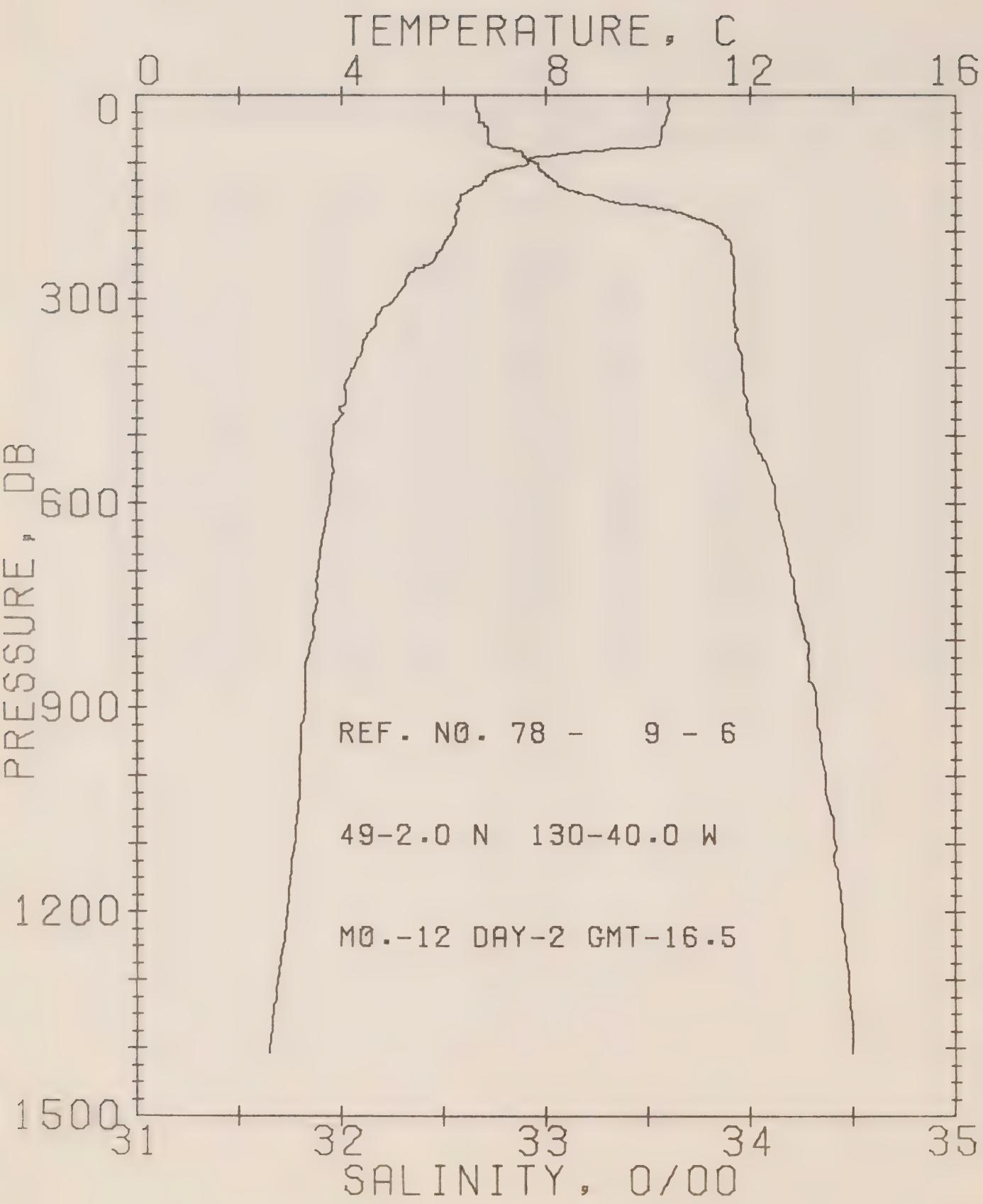
GMT 10.3

STATION 5

RESULTS OF STP CAST 335 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.20	32.30	0	24.84	312.2	.00	.00	1488.
10	10.20	32.31	10	24.84	311.7	.31	.02	1488.
20	10.20	32.32	20	24.85	311.1	.62	.06	1488.
30	10.21	32.31	30	24.84	312.0	.93	.14	1488.
50	10.17	32.51	50	25.00	297.2	1.56	.40	1489.
75	7.42	32.85	75	25.69	231.8	2.20	.80	1479.
100	6.78	33.08	99	25.96	206.7	2.75	1.29	1477.
125	6.49	33.40	124	26.25	179.5	3.23	1.84	1477.
150	6.60	33.74	149	26.51	155.5	3.65	2.43	1478.
175	6.43	33.86	174	26.62	144.7	4.03	3.05	1478.
200	6.28	33.93	199	26.70	138.3	4.38	3.73	1478.
225	5.98	33.96	223	26.76	132.7	4.72	4.46	1477.
250	5.67	33.98	248	26.81	127.7	5.04	5.25	1476.
300	5.44	34.01	298	26.86	123.3	5.67	7.00	1476.
400	4.90	34.04	397	26.95	115.8	6.86	11.26	1476.
500	4.43	34.09	496	27.04	107.6	7.98	16.37	1476.
600	4.22	34.16	595	27.12	100.8	9.02	22.17	1476.
800	3.53	34.26	793	27.27	87.6	10.88	35.46	1477.
1000	3.22	34.38	991	27.39	76.6	12.52	50.46	1479.
1200	3.01	34.47	1188	27.48	68.8	13.98	66.80	1482.



OFFSHORE OCEANOGRAPHY GROUP

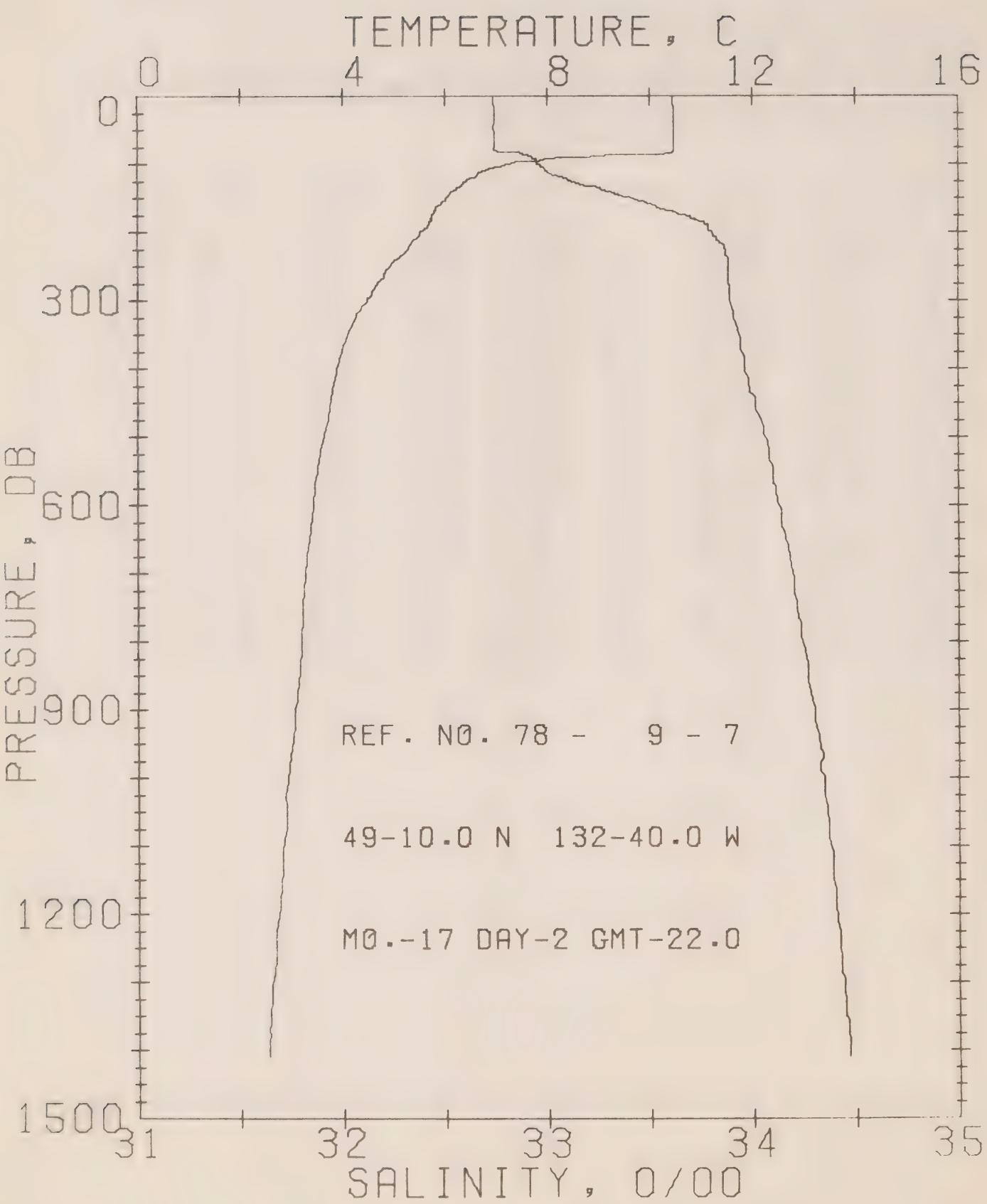
REFERENCE NO. 78- 9- 6 DATE 2/12/78

POSITION 49- 2.0N, 130-40.0W GMT 16.5 STATION 6

RESULTS OF STP CAST 255 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.42	32.65	0	25.07	289.9	.00	.00	1489.
10	10.41	32.65	10	25.07	289.9	.29	.01	1489.
20	10.43	32.66	20	25.08	289.8	.58	.06	1489.
30	10.40	32.67	30	25.09	288.7	.87	.13	1489.
50	10.28	32.71	50	25.14	284.2	1.44	.37	1489.
75	10.17	32.73	75	25.18	281.4	2.15	.82	1489.
100	7.65	32.96	99	25.75	227.1	2.76	1.36	1481.
125	6.83	33.03	124	25.91	211.4	3.31	1.99	1478.
150	6.31	33.25	149	26.16	188.4	3.81	2.69	1476.
175	6.23	33.68	174	26.50	156.2	4.24	3.40	1477.
200	6.16	33.86	199	26.65	142.0	4.61	4.11	1477.
225	5.95	33.91	223	26.72	136.1	4.96	4.86	1477.
250	5.67	33.92	248	26.76	132.2	5.30	5.67	1476.
300	5.23	33.93	298	26.82	126.8	5.94	7.46	1475.
400	4.24	33.96	397	26.96	114.3	7.14	11.73	1473.
500	3.83	34.01	496	27.04	107.2	8.24	16.80	1473.
600	3.75	34.12	595	27.14	98.6	9.26	22.52	1474.
800	3.43	34.27	793	27.29	85.2	11.10	35.57	1477.
1000	3.17	34.37	991	27.39	76.7	12.71	50.31	1479.
1200	2.93	34.45	1188	27.47	69.4	14.17	66.68	1481.



OFFSHORE OCEANOGRAPHY GROUP

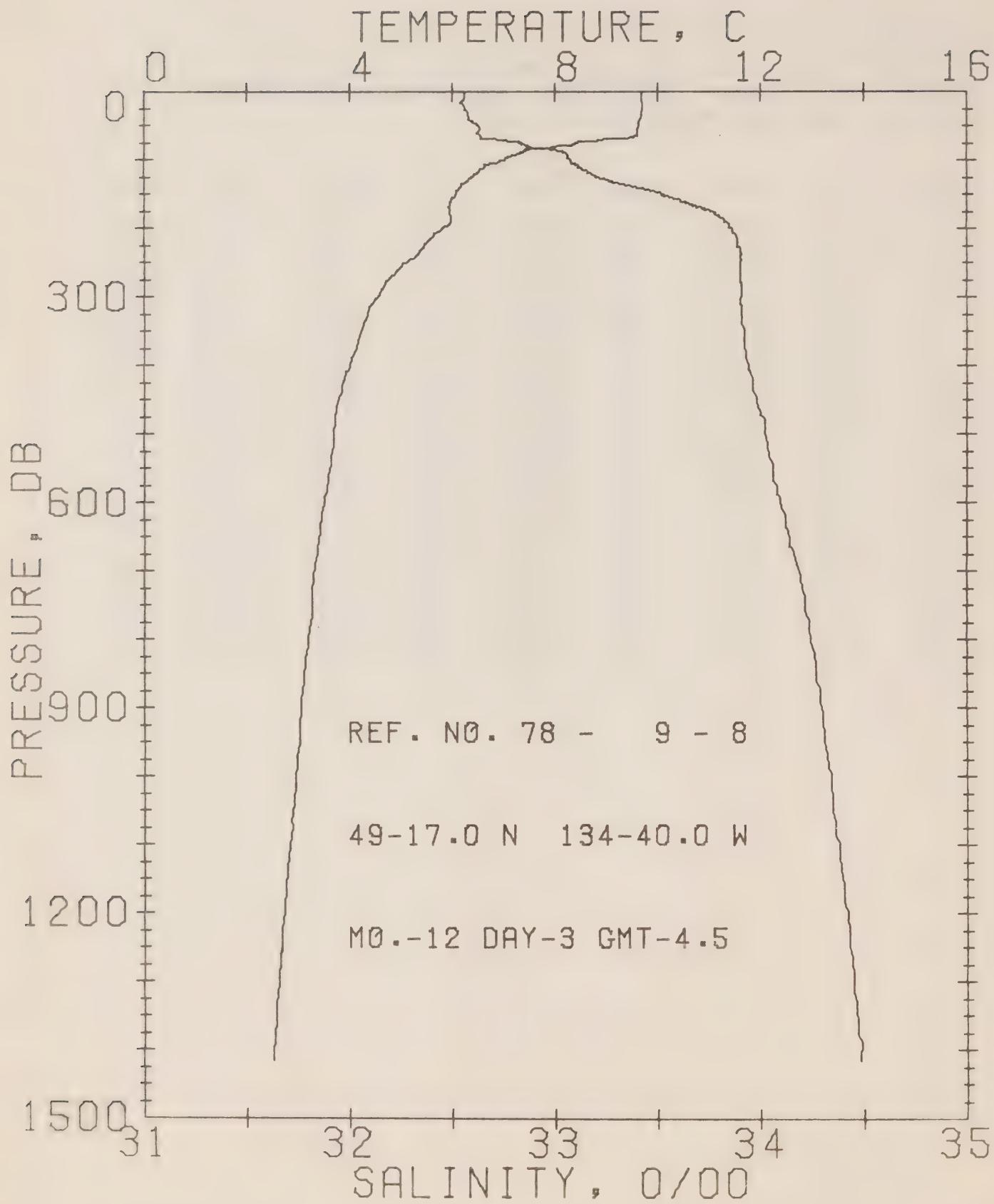
REFERENCE NO. 78- 9- 7 DATE 2/17/78

POSITION 49-10.0N, 132-40.0W GMT 22.0 STATION 7

RESULTS OF STP CAST 298 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	10.46	32.73	0	25.13	284.6	.00	.00	1489.
10	10.46	32.73	10	25.13	284.8	.28	.01	1489.
20	10.47	32.74	20	25.13	284.4	.57	.06	1490.
30	10.47	32.74	30	25.13	284.6	.85	.13	1490.
50	10.48	32.73	50	25.13	285.7	1.42	.36	1490.
75	10.48	32.74	75	25.13	285.8	2.14	.82	1490.
100	7.18	32.96	99	25.81	220.8	2.78	1.38	1479.
125	6.40	33.11	124	26.03	199.9	3.30	1.99	1476.
150	6.01	33.42	149	26.33	172.3	3.77	2.64	1475.
175	5.74	33.67	174	26.56	150.7	4.17	3.31	1475.
200	5.50	33.80	199	26.69	138.7	4.53	3.99	1475.
225	5.26	33.87	223	26.77	130.7	4.87	4.72	1474.
250	4.90	33.88	248	26.82	126.1	5.19	5.50	1473.
300	4.47	33.89	298	26.88	121.1	5.81	7.23	1472.
400	3.87	33.96	397	27.00	110.3	6.95	11.31	1471.
500	3.61	34.06	496	27.10	101.1	8.01	16.15	1472.
600	3.41	34.13	595	27.18	94.3	8.99	21.61	1473.
800	3.17	34.24	793	27.28	85.3	10.77	34.32	1475.
1000	2.92	34.35	990	27.40	75.4	12.38	49.02	1478.
1200	2.72	34.41	1188	27.46	70.1	13.84	65.36	1480.



## OFFSHORE OCEANOGRAPHY GROUP

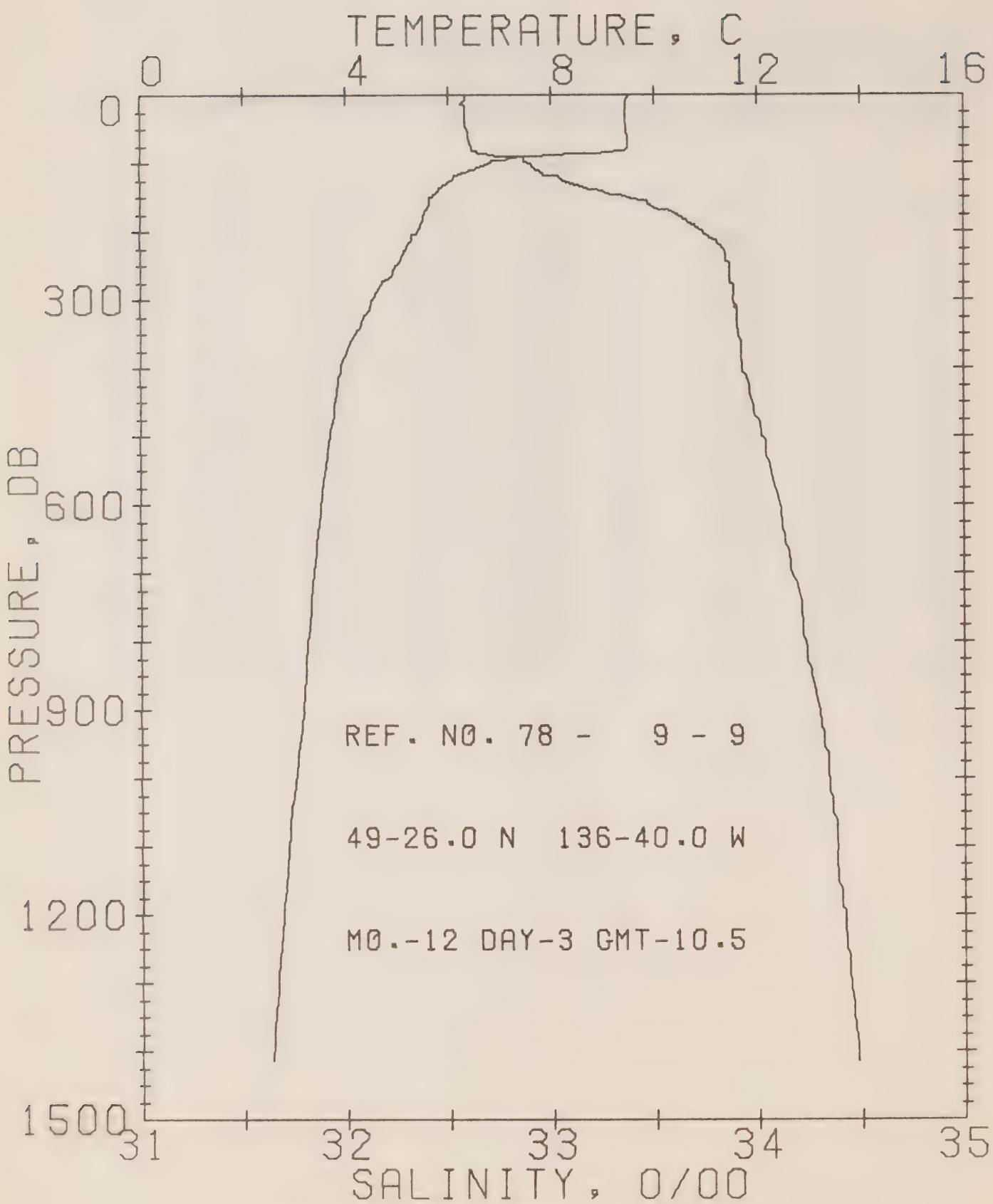
REFERENCE NO. 78- 9- 8 DATE 3/12/78

POSITION 49-17.0N, 134-40.0W GMT 4.5 STATION 8

RESULTS OF STP CAST 278 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.68	32.56	0	25.12	284.8	.00	.00	1486.
10	9.69	32.55	10	25.12	285.6	.28	.01	1486.
20	9.70	32.55	20	25.11	286.2	.57	.06	1486.
30	9.69	32.57	30	25.13	284.8	.86	.13	1487.
50	9.62	32.62	50	25.18	280.2	1.42	.36	1487.
75	8.36	32.84	75	25.55	245.6	2.10	.79	1483.
100	6.93	33.07	99	25.93	209.3	2.66	1.29	1478.
125	6.36	33.22	124	26.13	191.3	3.16	1.86	1476.
150	6.06	33.52	149	26.40	165.5	3.61	2.48	1476.
175	5.96	33.77	174	26.61	146.2	3.99	3.12	1470.
200	5.80	33.86	199	26.70	137.9	4.35	3.80	1476.
225	5.45	33.89	223	26.77	131.5	4.68	4.53	1475.
250	5.09	33.90	248	26.82	126.8	5.01	5.31	1474.
300	4.55	33.91	298	26.88	120.8	5.62	7.03	1473.
400	4.00	33.94	397	26.97	113.3	6.79	11.18	1472.
500	3.68	34.02	496	27.06	104.6	7.87	16.14	1472.
600	3.50	34.09	595	27.14	98.1	8.88	21.83	1473.
800	3.17	34.24	793	27.29	85.0	10.70	34.73	1475.
1000	2.94	34.34	990	27.39	76.4	12.31	49.45	1478.
1200	2.71	34.42	1188	27.47	69.1	13.77	65.85	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 9 DATE 3/12/78

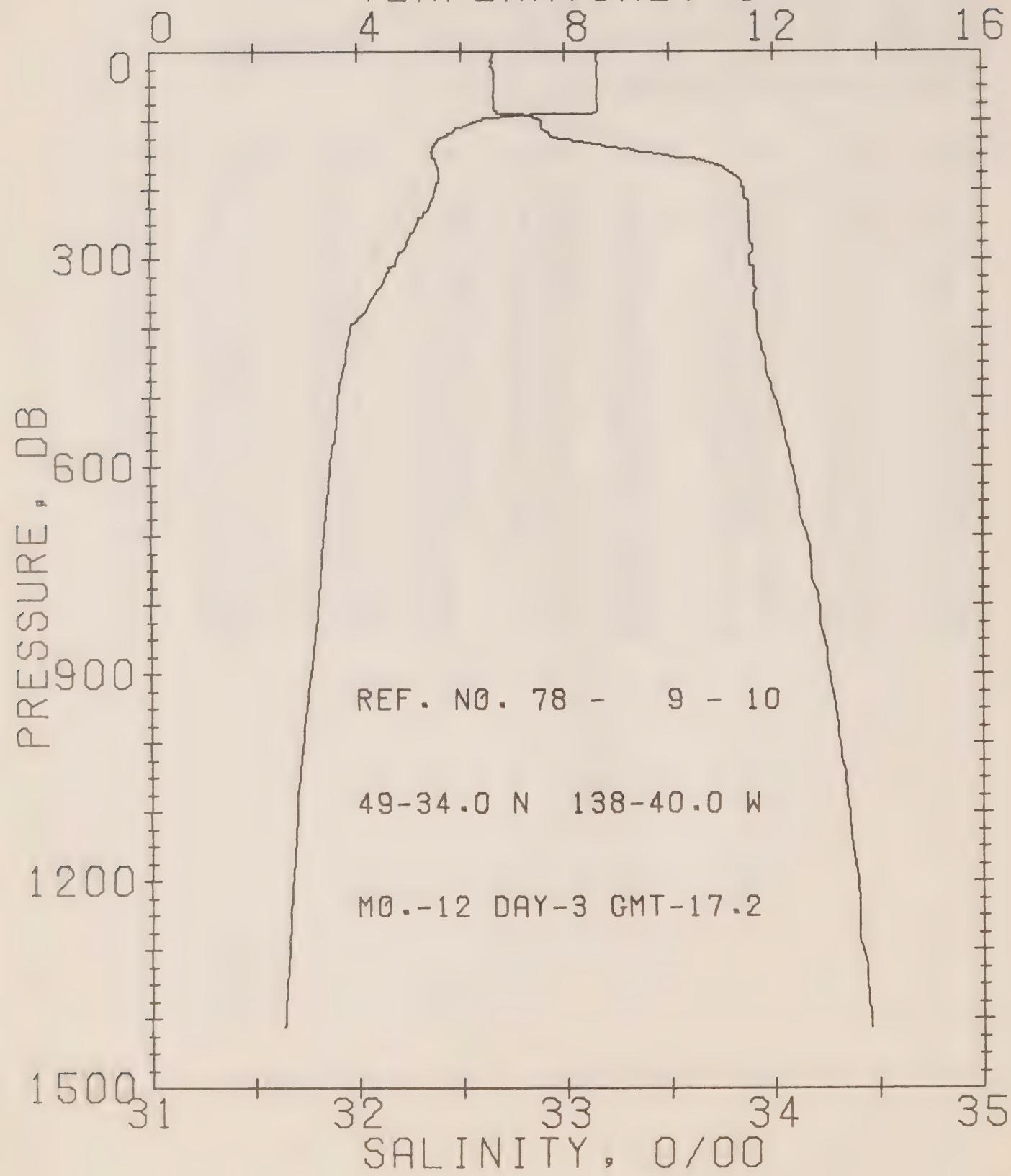
POSITION 49-26.0N, 136-40.0W GMT 10.5 STATION 9

RESULTS OF STP CAST 281 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	9.49	32.58	0	25.17	280.4	.00	.00	1485.
10	9.45	32.57	10	25.17	280.4	.28	.01	1485.
20	9.45	32.58	20	25.18	280.1	.56	.06	1486.
30	9.45	32.58	30	25.18	280.3	.84	.13	1486.
50	9.47	32.59	50	25.18	280.5	1.40	.36	1486.
75	9.49	32.61	75	25.19	279.7	2.10	.80	1487.
100	6.77	32.89	99	25.81	220.7	2.73	1.36	1477.
125	6.04	33.05	124	26.03	200.0	3.26	1.96	1475.
150	5.63	33.38	149	26.34	170.8	3.73	2.62	1474.
175	5.51	33.60	174	26.53	153.0	4.13	3.29	1474.
200	5.40	33.73	199	26.65	142.5	4.50	3.99	1474.
225	5.15	33.83	223	26.76	132.2	4.84	4.73	1474.
250	4.98	33.87	248	26.81	127.8	5.17	5.52	1473.
300	4.50	33.88	298	26.87	122.2	5.79	7.26	1472.
400	3.89	33.93	397	26.97	112.8	6.96	11.43	1471.
500	3.67	34.02	496	27.06	104.5	8.05	16.40	1472.
600	3.50	34.11	595	27.15	97.2	9.05	22.05	1473.
800	3.23	34.23	793	27.27	86.4	10.89	35.09	1476.
1000	2.99	34.35	990	27.39	76.5	12.51	49.96	1478.
1200	2.75	34.42	1188	27.47	69.5	13.97	66.32	1480.

## TEMPERATURE, C



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 10

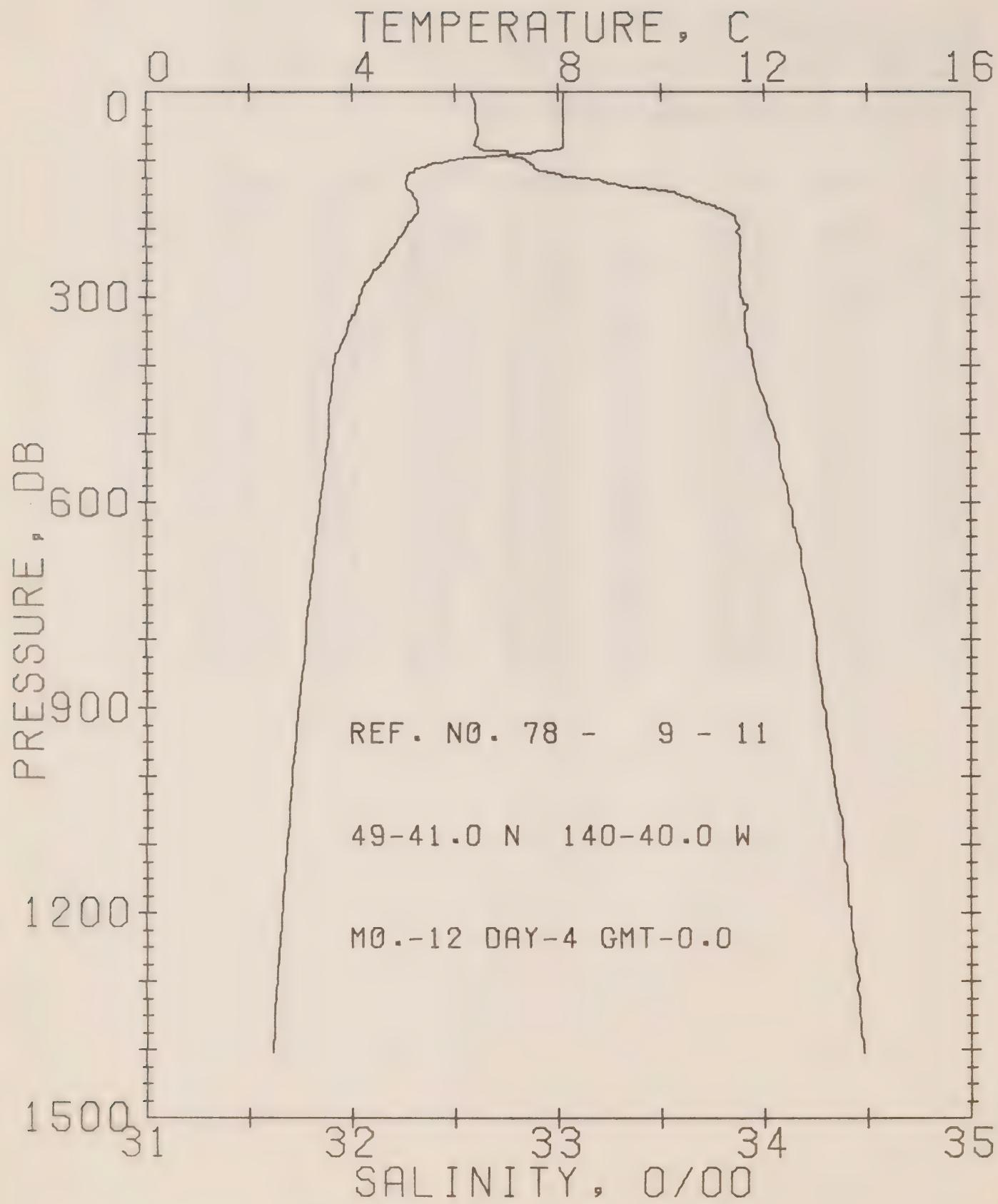
DATE 3/12/78

POSITION 49-34.0N, 138-40.0W GMT 17.2 STATION 10

RESULTS OF STP CAST 244 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.64	32.65	0	25.36	262.5	.00	.00	1482.
10	8.61	32.65	10	25.36	262.5	.26	.01	1482.
20	8.62	32.64	20	25.36	263.1	.53	.05	1483.
30	8.62	32.66	30	25.37	262.0	.79	.12	1483.
50	8.63	32.66	50	25.37	262.5	1.31	.33	1483.
75	8.62	32.66	75	25.37	262.8	1.97	.75	1483.
100	6.33	32.89	99	25.87	215.2	2.59	1.30	1475.
125	5.60	32.97	124	26.02	200.8	3.11	1.90	1473.
150	5.43	33.48	149	26.44	161.0	3.56	2.53	1473.
175	5.57	33.79	174	26.68	139.4	3.93	3.14	1475.
200	5.48	33.86	199	26.74	133.8	4.27	3.79	1475.
225	5.36	33.88	223	26.77	131.2	4.60	4.51	1475.
250	5.14	33.89	248	26.80	128.1	4.93	5.29	1474.
300	4.73	33.89	298	26.85	124.0	5.56	7.05	1473.
400	3.85	33.92	397	26.97	113.2	6.74	11.27	1471.
500	3.59	34.00	496	27.05	105.3	7.83	16.27	1472.
600	3.44	34.08	595	27.14	98.1	8.85	21.96	1473.
800	3.21	34.22	793	27.26	87.2	10.70	35.14	1476.
1000	2.92	34.31	990	27.37	78.0	12.35	50.25	1478.
1200	2.71	34.40	1188	27.46	70.5	13.83	66.85	1480.



OFFSHORE OCEANOGRAPHY GROUP

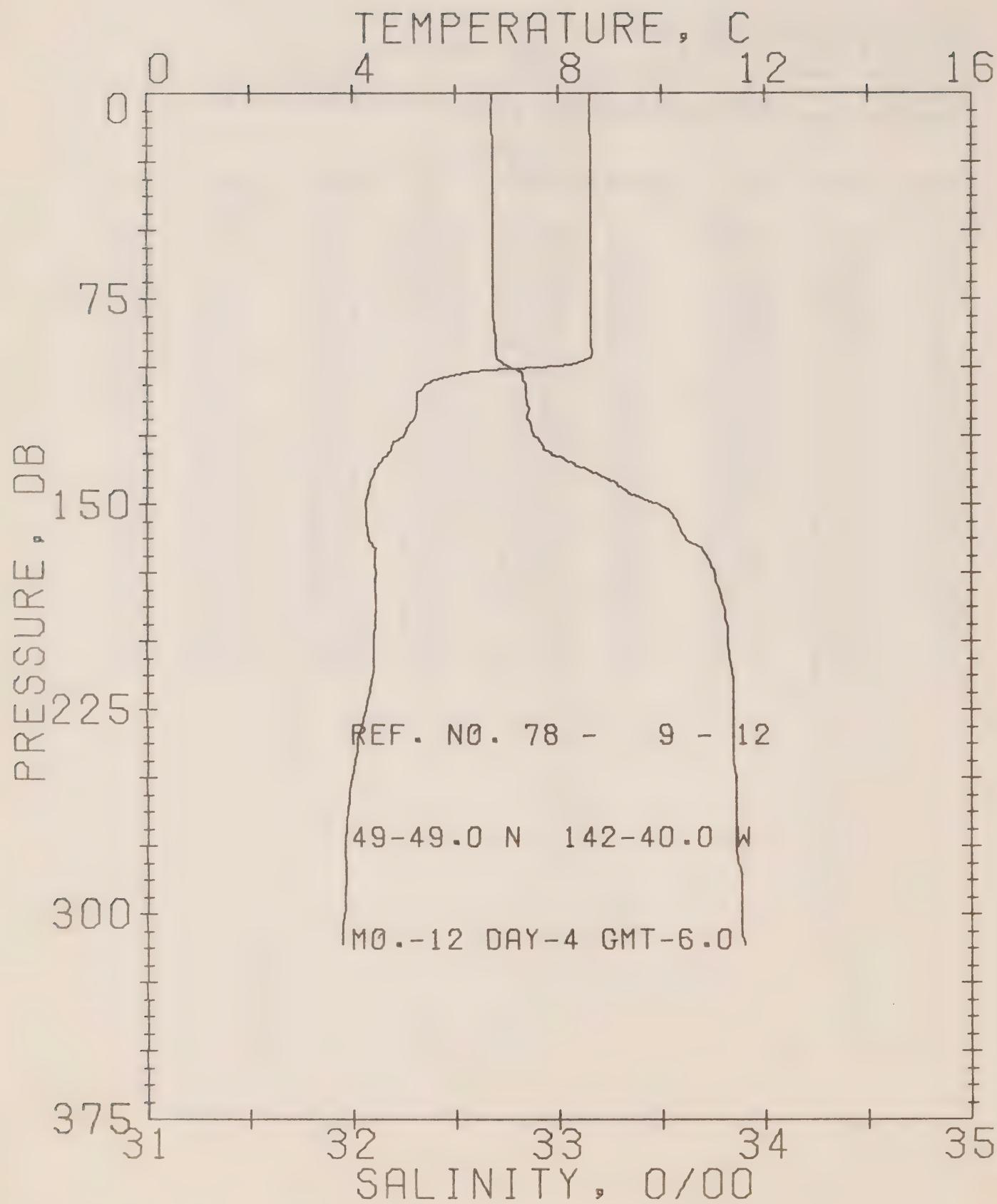
REFERENCE NO. 78- 9- 11 DATE 4/12/78

POSITION 49-41.0N, 140-40.0W GMT .0 STATION 11

RESULTS OF STP CAST 276 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.11	32.58	0	25.38	260.2	.00	.00	1480.
10	8.11	32.58	10	25.39	260.1	.26	.01	1480.
20	8.11	32.60	20	25.40	259.0	.52	.05	1481.
30	8.11	32.60	30	25.40	259.2	.78	.12	1481.
50	8.10	32.61	50	25.41	258.9	1.30	.33	1481.
75	8.11	32.60	75	25.40	259.9	1.95	.74	1481.
100	5.88	32.85	99	25.89	212.8	2.55	1.28	1473.
125	5.06	33.09	124	26.18	185.7	3.05	1.86	1471.
150	5.19	33.58	149	26.55	150.5	3.47	2.44	1472.
175	5.28	33.82	174	26.73	134.1	3.83	3.03	1473.
200	5.04	33.88	199	26.81	127.2	4.15	3.65	1473.
225	4.81	33.89	223	26.84	124.1	4.47	4.33	1472.
250	4.59	33.89	248	26.86	121.9	4.78	5.08	1472.
300	4.13	33.89	298	26.91	117.5	5.37	6.75	1471.
400	3.64	33.95	397	27.01	108.7	6.50	10.78	1470.
500	3.54	34.05	496	27.10	101.0	7.55	15.58	1472.
600	3.38	34.12	595	27.17	94.7	8.53	21.06	1473.
800	3.08	34.25	793	27.30	83.3	10.30	33.65	1475.
1000	2.83	34.34	990	27.40	75.3	11.89	48.22	1477.
1200	2.63	34.42	1188	27.48	68.2	13.32	64.21	1480.



OFFSHORE OCEANOGRAPHY GROUP

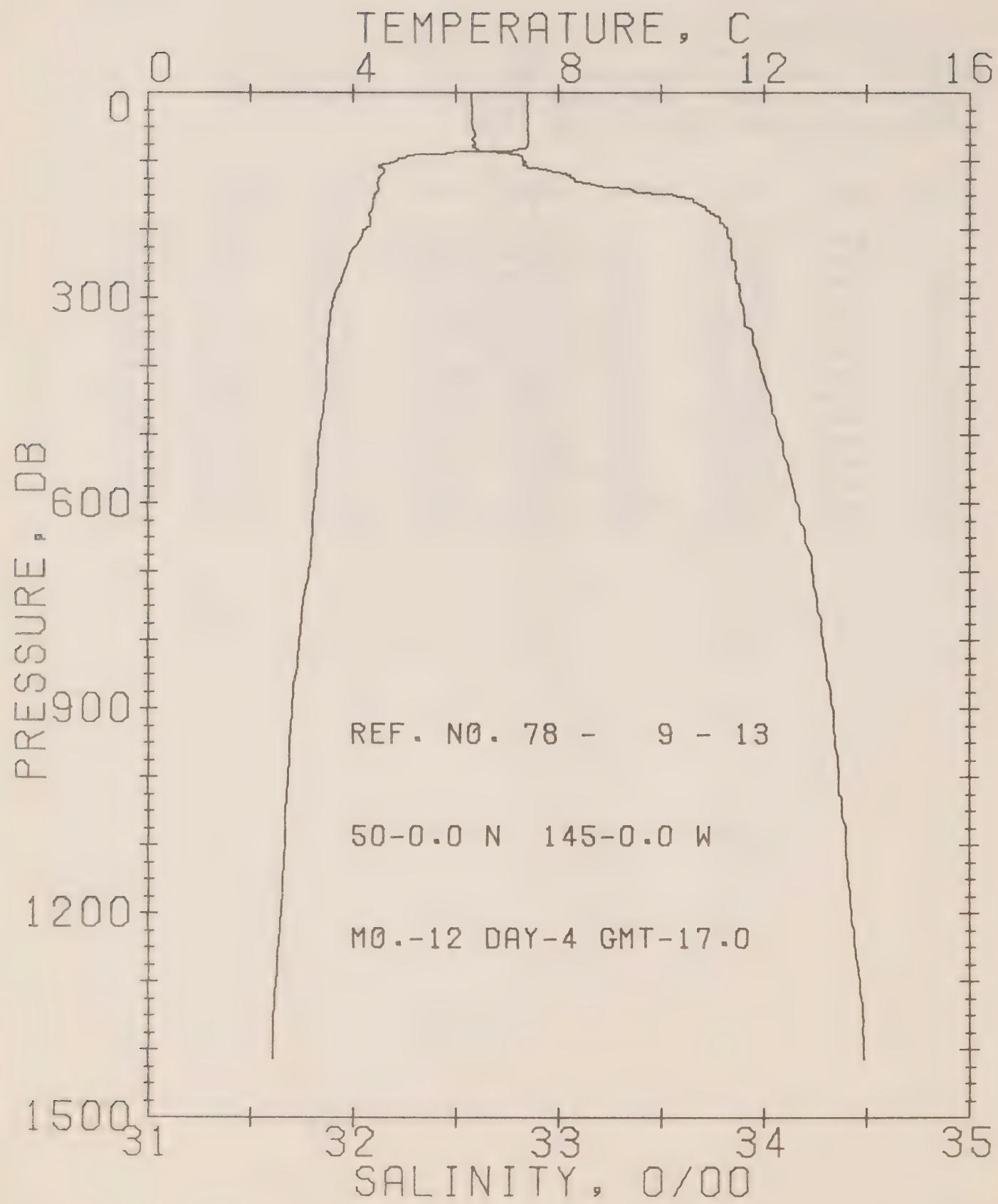
REFERENCE NO. 78- 9- 12 DATE 4/12/78

POSITION 49-49.0N, 142-40.0W GMT 6.0 STATION 12

RESULTS OF STP CAST 123 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.61	32.67	0	25.38	260.6	.00	.00	1482.
10	8.62	32.67	10	25.38	260.9	.26	.01	1482.
20	8.63	32.68	20	25.38	260.5	.52	.05	1483.
30	8.63	32.68	30	25.38	260.7	.78	.12	1483.
50	8.65	32.68	50	25.38	261.3	1.30	.33	1483.
75	8.64	32.68	75	25.38	261.5	1.96	.75	1484.
100	7.60	32.76	99	25.60	241.3	2.61	1.33	1480.
125	4.98	32.88	124	26.02	200.6	3.13	1.92	1470.
150	4.25	33.49	149	26.58	147.4	3.57	2.54	1468.
175	4.45	33.76	174	26.77	129.8	3.91	3.11	1470.
200	4.40	33.82	199	26.83	124.7	4.23	3.71	1470.
225	4.23	33.85	223	26.87	120.9	4.54	4.38	1470.
250	3.98	33.86	248	26.91	117.7	4.83	5.10	1469.
300	3.82	33.89	298	26.95	114.2	5.41	6.72	1469.



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 13

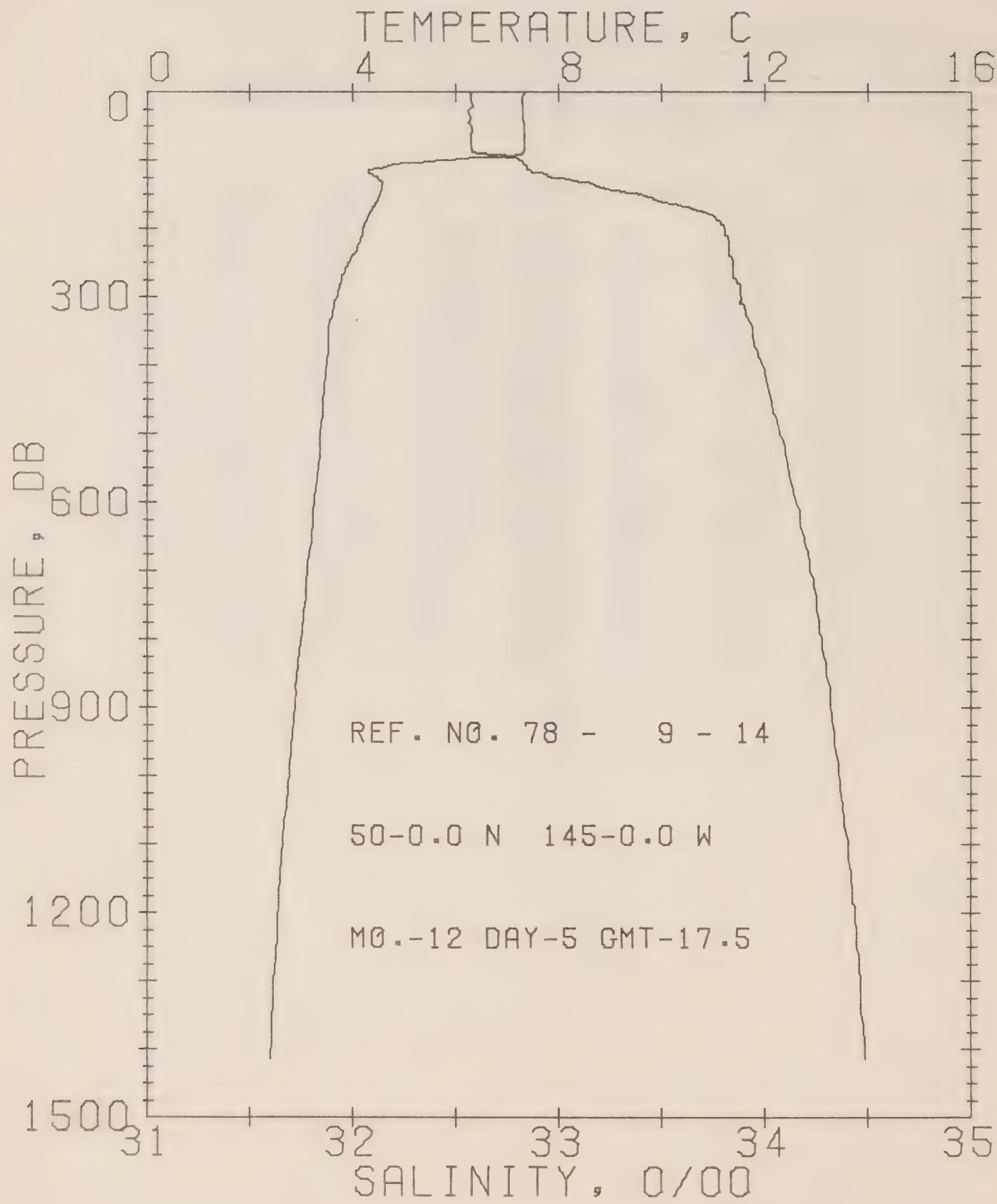
DATE 4/12/78

POSITION 50- .0N, 145- .0W GMT 17.0 STATION P

RESULTS OF STP CAST 287 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED. PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.40	32.57	0	25.48	251.3	.00	.00	1477.
10	7.39	32.57	10	25.48	251.4	.25	.01	1478.
20	7.40	32.58	20	25.48	250.9	.50	.05	1478.
30	7.40	32.58	30	25.48	251.1	.75	.12	1478.
50	7.41	32.58	50	25.48	251.4	1.26	.32	1478.
75	7.41	32.59	75	25.49	251.0	1.88	.72	1479.
100	4.82	32.83	99	26.00	202.4	2.45	1.22	1469.
125	4.49	33.07	124	26.23	181.1	2.93	1.77	1468.
150	4.40	33.56	149	26.62	143.7	3.35	2.36	1469.
175	4.29	33.74	174	26.78	129.3	3.69	2.92	1469.
200	4.22	33.82	199	26.85	122.8	4.00	3.52	1469.
225	4.00	33.84	223	26.89	119.2	4.31	4.17	1469.
250	3.88	33.86	248	26.92	116.7	4.60	4.89	1469.
300	3.62	33.89	298	26.97	112.2	5.17	6.49	1469.
400	3.48	33.98	397	27.05	104.9	6.26	10.35	1470.
500	3.34	34.07	496	27.13	97.4	7.27	14.97	1471.
600	3.23	34.16	595	27.22	90.2	8.20	20.21	1472.
800	2.94	34.29	793	27.35	78.9	9.89	32.20	1474.
1000	2.72	34.37	990	27.43	71.8	11.39	45.95	1477.
1200	2.59	34.43	1188	27.49	67.0	12.78	61.52	1480.



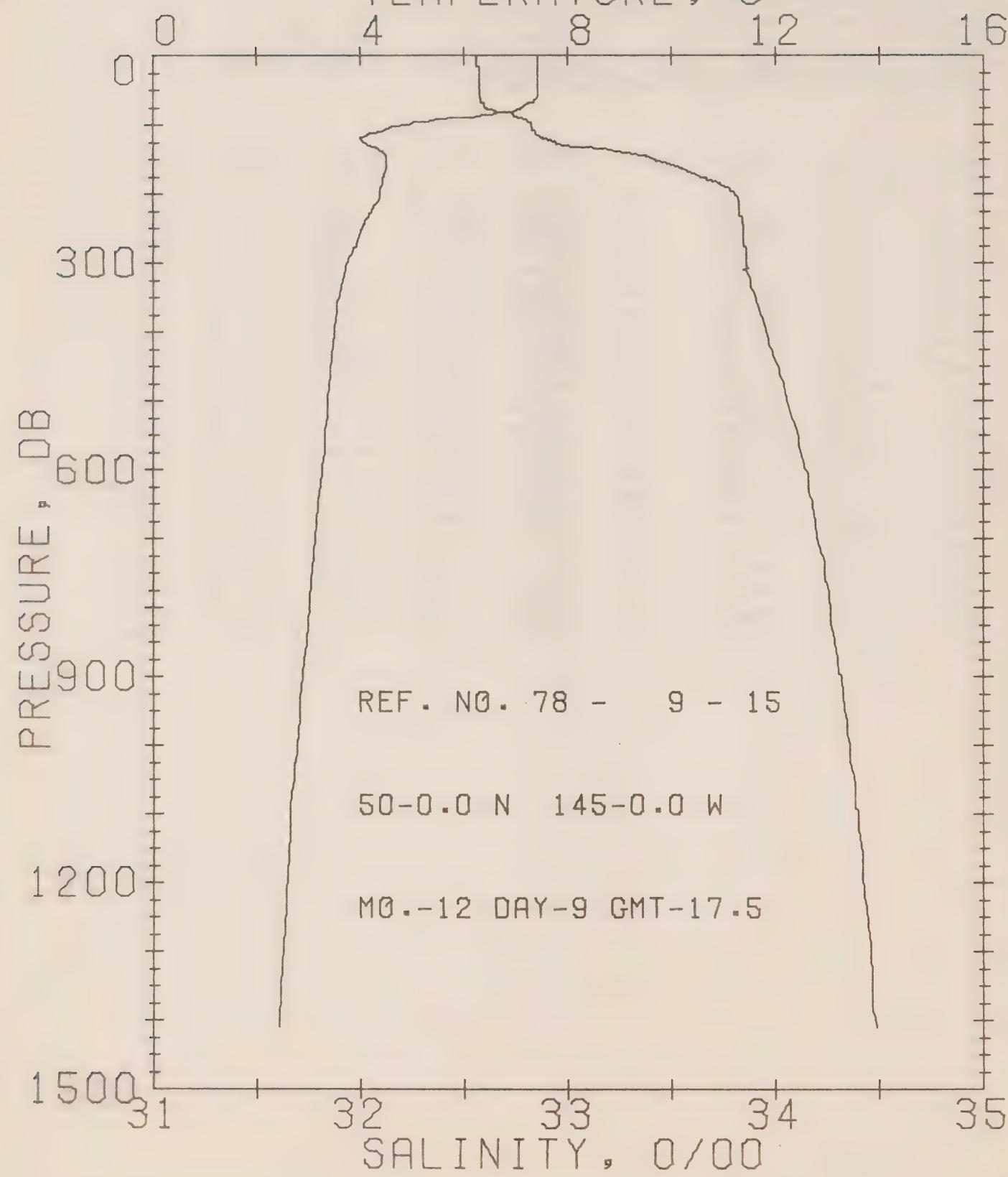
## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 14 DATE 5/12/78

POSITION 50- .0N, 145- .0W GMT 17.5 STATION P  
RESULTS OF STP CAST 265 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.34	32.56	0	25.48	251.3	.00	.00	1477.
10	7.29	32.57	10	25.49	250.0	.25	.01	1477.
20	7.30	32.58	20	25.50	249.6	.50	.05	1477.
30	7.31	32.56	30	25.48	251.3	.75	.11	1478.
50	7.33	32.57	50	25.49	251.1	1.25	.32	1478.
75	7.33	32.57	75	25.49	251.4	1.88	.72	1478.
100	5.73	32.81	99	25.88	214.0	2.49	1.26	1473.
125	4.49	32.96	124	26.14	189.4	2.98	1.83	1468.
150	4.53	33.39	149	26.48	157.8	3.42	2.43	1469.
175	4.33	33.69	174	26.74	133.1	3.78	3.04	1469.
200	4.19	33.80	199	26.84	123.7	4.10	3.64	1469.
225	4.09	33.83	223	26.87	121.0	4.41	4.31	1469.
250	3.91	33.85	248	26.90	117.7	4.71	5.03	1469.
300	3.70	33.89	298	26.95	113.3	5.28	6.65	1469.
400	3.49	33.99	397	27.06	104.3	6.37	10.52	1470.
500	3.37	34.07	496	27.13	97.6	7.38	15.15	1471.
600	3.25	34.15	595	27.21	91.3	8.32	20.42	1472.
800	2.99	34.28	793	27.33	80.1	10.03	32.56	1475.
1000	2.76	34.36	990	27.42	72.7	11.55	46.53	1477.
1200	2.55	34.44	1188	27.50	65.8	12.94	62.00	1480.

TEMPERATURE, C



OFFSHORE OCEANOGRAPHY GROUP

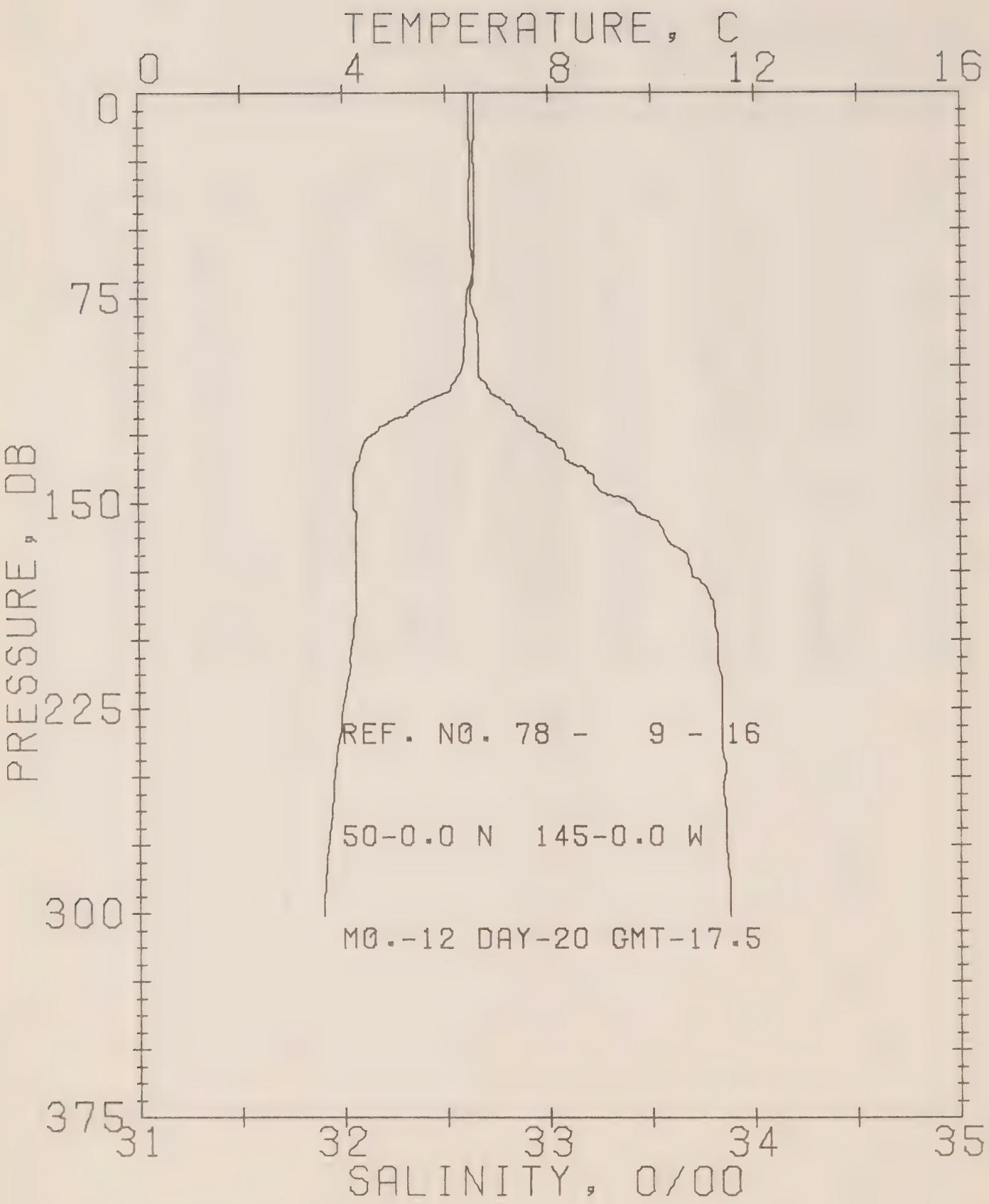
REFERENCE NO. 78- 9- 15 DATE 9/12/78

POSITION 50- .0N, 145- .0W GMT 17.5 STATION P

RESULTS OF STP CAST 257 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.42	32.56	0	25.47	252.4	.00	.00	1477.
10	7.41	32.56	10	25.47	252.4	.25	.01	1478.
20	7.42	32.57	20	25.47	251.9	.50	.05	1478.
30	7.42	32.57	30	25.47	252.0	.76	.12	1478.
50	7.42	32.57	50	25.47	252.3	1.26	.32	1478.
75	7.10	32.60	75	25.54	246.2	1.89	.72	1478.
100	4.83	32.82	99	25.99	203.2	2.45	1.22	1469.
125	4.00	32.93	124	26.16	186.9	2.94	1.78	1466.
150	4.50	33.42	149	26.50	155.2	3.36	2.37	1469.
175	4.45	33.64	174	26.68	138.5	3.73	2.98	1470.
200	4.37	33.80	199	26.82	125.8	4.06	3.60	1470.
225	4.21	33.83	223	26.86	122.2	4.37	4.27	1470.
250	4.02	33.85	248	26.89	118.9	4.67	5.00	1469.
300	3.73	33.86	298	26.93	115.6	5.25	6.65	1469.
400	3.49	33.96	397	27.03	106.8	6.37	10.61	1470.
500	3.37	34.05	496	27.12	99.0	7.39	15.31	1471.
600	3.26	34.15	595	27.20	91.6	8.34	20.64	1472.
800	3.00	34.27	793	27.33	81.0	10.07	32.91	1475.
1000	2.78	34.36	990	27.42	73.2	11.61	47.04	1477.
1200	2.59	34.42	1188	27.48	67.4	13.01	62.69	1480.



OFFSHORE OCEANOGRAPHY GROUP

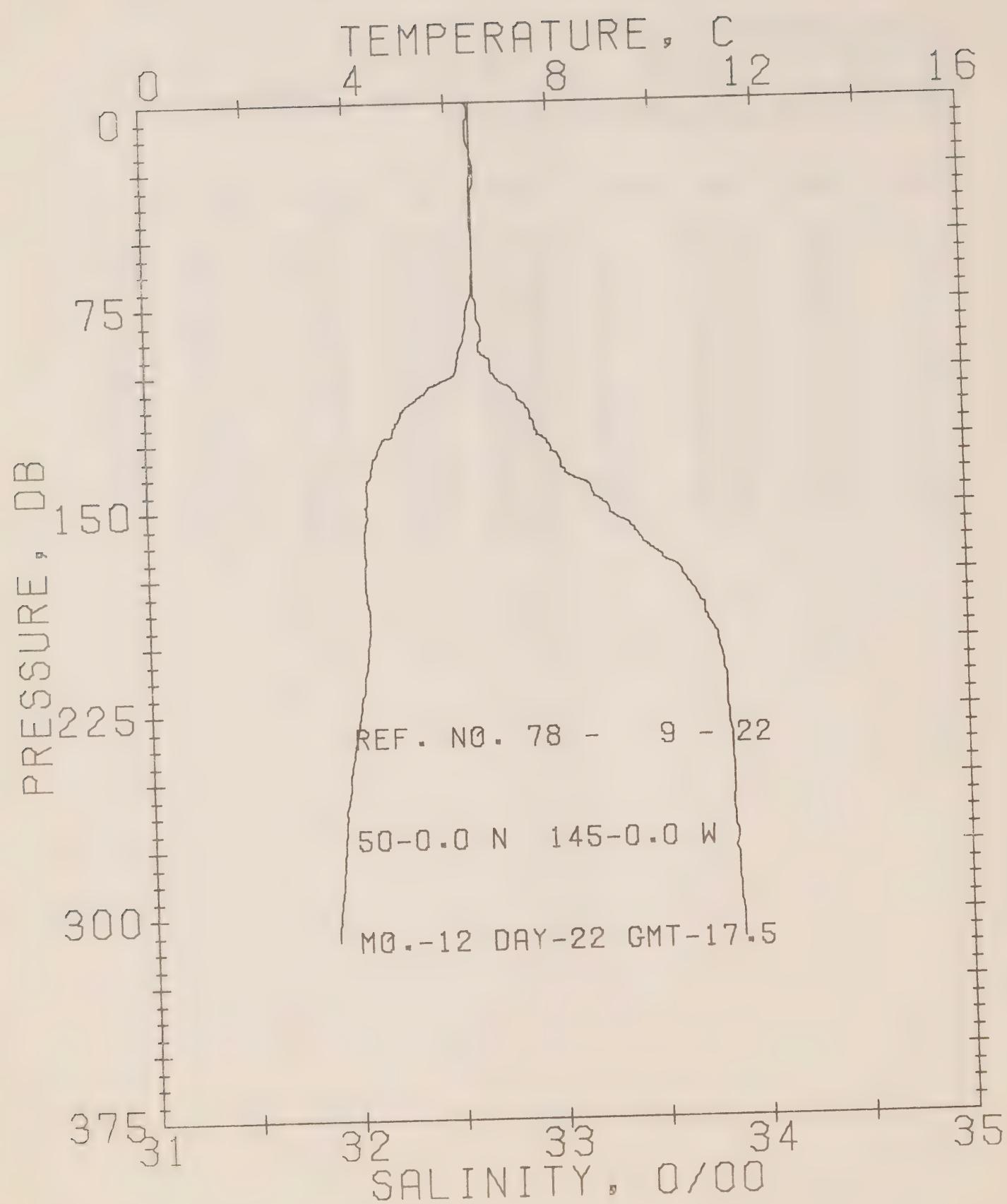
REFERENCE NO. 78- 9- 16 DATE 20/12/78

POSITION 50- .0N, 145- .0W GMT 17.5 STATION P

RESULTS OF STP CAST 133 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.56	32.61	0	25.62	237.7	.00	.00	1474.
10	6.55	32.61	10	25.62	237.7	.24	.01	1474.
20	6.54	32.62	20	25.63	237.1	.48	.05	1474.
30	6.56	32.62	30	25.63	237.4	.71	.11	1475.
50	6.56	32.62	50	25.63	237.6	1.19	.30	1475.
75	6.40	32.62	75	25.65	235.9	1.78	.68	1475.
100	6.33	32.66	99	25.69	232.3	2.36	1.20	1475.
125	4.55	32.98	124	26.15	188.5	2.90	1.81	1468.
150	4.20	33.40	149	26.52	153.6	3.33	2.41	1468.
175	4.24	33.69	174	26.74	132.5	3.68	3.00	1469.
200	4.16	33.82	199	26.85	122.2	4.00	3.60	1469.
225	3.97	33.84	223	26.89	119.0	4.30	4.25	1469.
250	3.80	33.86	248	26.92	116.3	4.59	4.96	1469.
300	3.60	33.88	298	26.96	112.8	5.17	6.57	1469.



OFFSHORE OCEANOGRAPHY GROUP

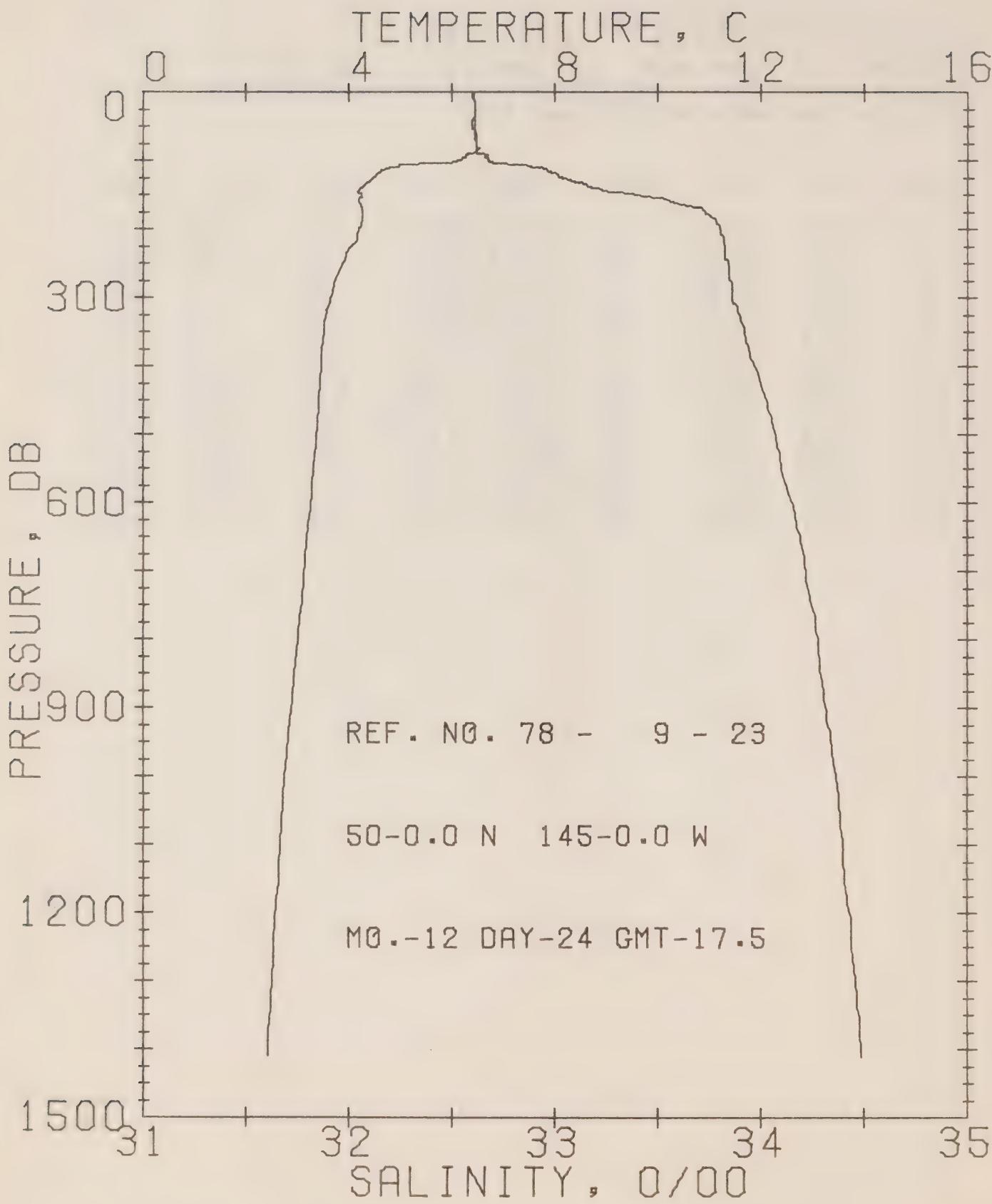
REFERENCE NO. 78- 9- 22 DATE 22/12/78

POSITION 50- .0N, 145- .0W GMT 17.5 STATION P

RESULTS OF STP CAST 192 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.47	32.60	0	25.62	237.3	.00	.00	1474.
10	6.47	32.60	10	25.62	237.5	.24	.01	1474.
20	6.47	32.62	20	25.64	236.1	.47	.05	1474.
30	6.46	32.63	30	25.65	235.3	.71	.11	1474.
50	6.48	32.62	50	25.64	236.6	1.18	.30	1475.
75	6.37	32.63	75	25.66	234.7	1.77	.68	1475.
100	6.08	32.70	99	25.75	226.3	2.35	1.19	1474.
125	4.62	32.97	124	26.13	190.0	2.87	1.78	1469.
150	4.29	33.26	149	26.40	165.1	3.31	2.41	1468.
175	4.23	33.61	174	26.68	138.4	3.69	3.03	1469.
200	4.29	33.76	199	26.81	126.1	4.02	3.66	1470.
225	4.10	33.83	223	26.87	121.2	4.33	4.33	1469.
250	3.87	33.85	248	26.91	117.4	4.63	5.05	1469.
300	3.60	33.88	298	26.96	112.8	5.21	6.67	1469.



## OFFSHORE OCEANOGRAPHY GROUP

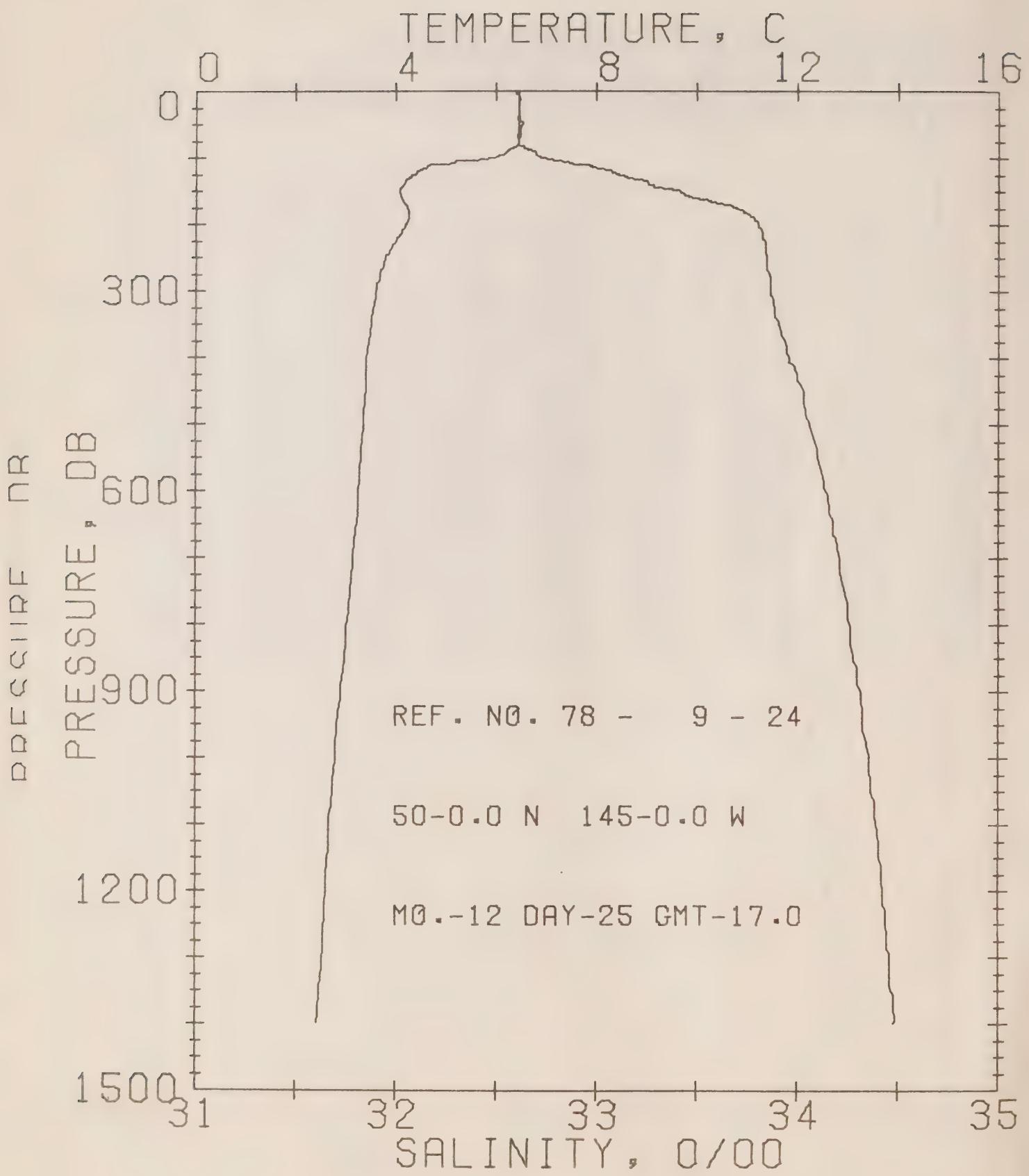
REFERENCE NO. 78- 9- 23

DATE 24/12/78

POSITION 50- .0N, 145- .0W GMT 17.5 STATION P

RESULTS OF STP CAST 222 POINTS TAKEN FROM ANALOG TRACE  
GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.43	32.60	0	25.63	236.8	.00	.00	1474.
10	6.43	32.60	10	25.63	236.7	.24	.01	1474.
20	6.45	32.61	20	25.63	236.6	.47	.05	1474.
30	6.45	32.61	30	25.63	236.7	.71	.11	1474.
50	6.46	32.60	50	25.63	237.8	1.18	.30	1475.
75	6.47	32.62	75	25.64	236.7	1.78	.68	1475.
100	6.12	32.68	99	25.73	228.3	2.36	1.20	1474.
125	4.47	33.03	124	26.20	183.6	2.86	1.77	1468.
150	4.24	33.39	149	26.51	154.8	3.29	2.57	1468.
175	4.27	33.73	174	26.77	129.8	3.64	2.94	1469.
200	4.19	33.80	199	26.84	123.8	3.95	3.55	1469.
225	4.04	33.83	223	26.88	120.4	4.26	4.21	1469.
250	3.88	33.84	248	26.90	118.2	4.56	4.93	1469.
300	3.63	33.86	298	26.94	114.6	5.14	6.56	1469.
400	3.46	33.97	397	27.05	105.2	6.23	10.46	1470.
500	3.36	34.07	496	27.13	97.8	7.24	15.10	1471.
600	3.25	34.15	595	27.21	91.1	8.19	20.42	1472.
800	3.00	34.28	793	27.33	80.2	9.91	32.59	1475.
1000	2.75	34.37	990	27.43	72.1	11.44	46.63	1477.
1200	2.58	34.43	1188	27.49	66.8	12.83	62.24	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 24

DATE 25/12/78

POSITION 50- .0N, 145- .0W GMT 17.0 STATION P

RESULTS OF STP CAST 260 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.40	32.60	0	25.63	237.2	.00	.00	1474.
10	6.46	32.61	10	25.64	236.3	.24	.01	1474.
20	6.45	32.61	20	25.63	236.6	.47	.05	1474.
30	6.45	32.61	30	25.63	236.7	.71	.11	1474.
50	6.45	32.63	50	25.65	235.5	1.18	.30	1475.
75	6.45	32.61	75	25.63	237.2	1.77	.68	1475.
100	5.87	32.73	99	25.80	221.6	2.35	1.19	1473.
125	4.38	33.11	124	26.27	177.3	2.84	1.75	1468.
150	4.08	33.42	149	26.55	150.9	3.25	2.32	1468.
175	4.24	33.69	174	26.75	132.3	3.61	2.91	1469.
200	4.21	33.81	199	26.84	123.4	3.92	3.52	1469.
225	4.00	33.84	223	26.89	119.4	4.23	4.18	1469.
250	3.80	33.85	248	26.92	116.7	4.52	4.89	1469.
300	3.62	33.87	298	26.95	113.7	5.10	6.50	1469.
400	3.42	33.96	397	27.04	105.9	6.20	10.42	1470.
500	3.35	34.06	496	27.13	98.3	7.21	15.07	1471.
600	3.26	34.14	595	27.20	92.0	8.16	20.40	1472.
800	3.03	34.26	793	27.32	81.7	9.90	32.75	1475.
1000	2.79	34.36	990	27.42	73.3	11.45	46.95	1477.
1200	2.61	34.43	1188	27.49	67.3	12.86	62.68	1480.

50

## TEMPERATURE, C

0

4

8

12

16

PRESSURE, DB

600

900

1200

1500

REF. NO. 78 - 9 - 25

50-0.0 N 145-0.0 W

MO.-12 DAY-26 GMT-17.0

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SALINITY, P/00

OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 25

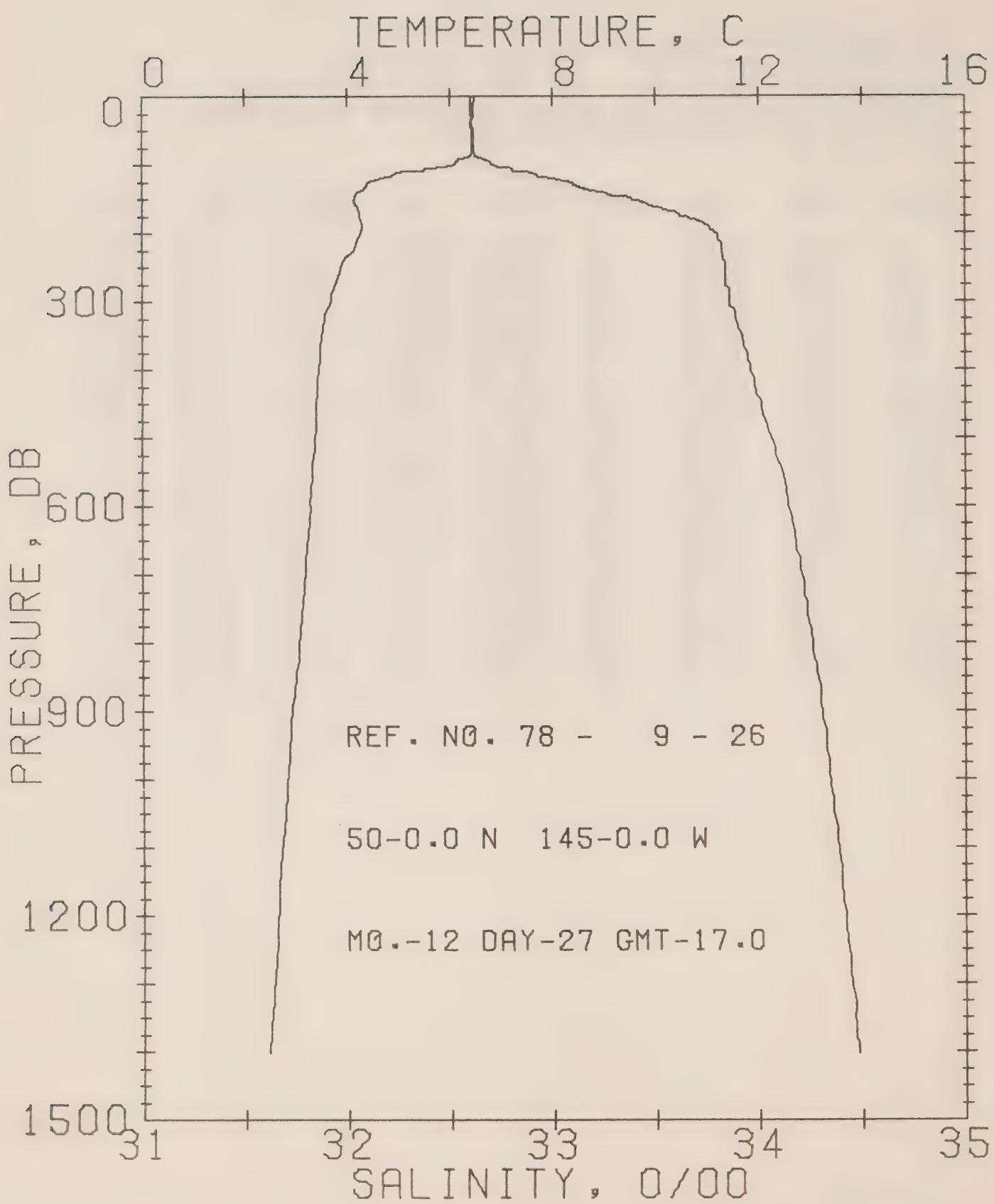
DATE 26/12/78

POSITION 50- .0N, 145- .0W GMT 17.0 STATION P

RESULTS OF STP CAST 260 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.45	32.60	0	25.63	237.1	.00	.00	1474.
10	6.46	32.61	10	25.63	236.6	.24	.01	1474.
20	6.47	32.62	20	25.64	236.2	.47	.05	1474.
30	6.47	32.61	30	25.63	236.7	.71	.11	1474.
50	6.48	32.61	50	25.63	237.3	1.18	.30	1475.
75	6.47	32.62	75	25.64	236.7	1.77	.68	1475.
100	5.99	32.71	99	25.77	224.5	2.36	1.20	1474.
125	4.46	33.03	124	26.20	183.8	2.87	1.78	1468.
150	4.08	33.33	149	26.47	157.7	3.30	2.38	1467.
175	4.25	33.70	174	26.75	131.9	3.66	2.98	1469.
200	4.21	33.81	199	26.84	123.4	3.97	3.58	1469.
225	4.00	33.84	223	26.89	119.2	4.28	4.23	1469.
250	3.80	33.86	248	26.92	115.9	4.57	4.95	1469.
300	3.57	33.88	298	26.96	112.5	5.14	6.54	1468.
400	3.41	33.96	397	27.04	105.6	6.23	10.42	1469.
500	3.34	34.06	496	27.13	98.0	7.25	15.08	1471.
600	3.24	34.14	595	27.20	91.5	8.19	20.39	1472.
800	3.00	34.27	793	27.33	80.8	9.91	32.61	1475.
1000	2.77	34.36	990	27.42	72.9	11.44	46.63	1477.
1200	2.54	34.44	1188	27.50	65.7	12.83	62.14	1486.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 26

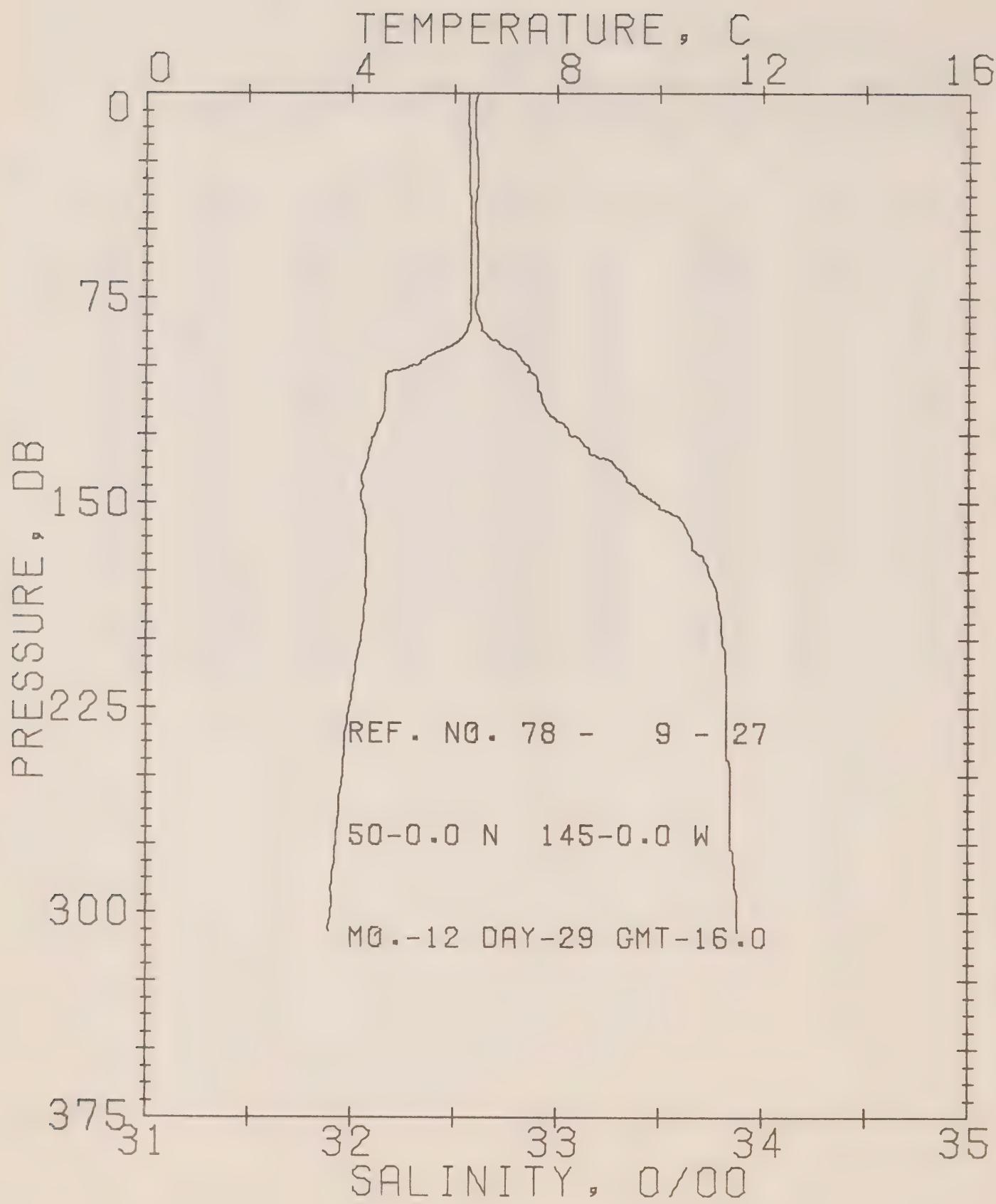
DATE 27/12/78

POSITION 50- .0N, 145- .0W GMT 17.0 STATION P

RESULTS OF STP CAST 269 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.41	32.62	0	25.65	235.1	.00	.00	1474.
10	6.40	32.61	10	25.64	235.9	.24	.01	1474.
20	6.40	32.61	20	25.64	236.0	.47	.05	1474.
30	6.42	32.61	30	25.64	236.3	.71	.11	1474.
50	6.43	32.61	50	25.64	236.7	1.18	.30	1474.
75	6.43	32.61	75	25.64	237.0	1.77	.68	1475.
100	6.07	32.70	99	25.75	226.2	2.36	1.20	1474.
125	4.42	33.08	124	26.24	179.7	2.86	1.78	1468.
150	4.12	33.38	149	26.51	154.3	3.29	2.37	1468.
175	4.24	33.62	174	26.69	137.8	3.65	2.97	1469.
200	4.26	33.79	199	26.82	125.5	3.98	3.59	1470.
225	4.12	33.82	223	26.86	122.0	4.28	4.26	1469.
250	3.88	33.84	248	26.90	118.2	4.58	4.98	1469.
300	3.67	33.86	298	26.94	115.0	5.17	6.62	1469.
400	3.44	33.96	397	27.04	105.9	6.26	10.52	1470.
500	3.37	34.06	496	27.12	98.7	7.29	15.21	1471.
600	3.27	34.14	595	27.20	92.1	8.24	20.52	1472.
800	3.05	34.26	793	27.31	82.4	9.97	32.89	1475.
1000	2.82	34.35	990	27.40	74.7	11.53	47.18	1477.
1200	2.62	34.42	1188	27.48	68.1	12.96	63.13	1480.



OFFSHORE OCEANOGRAPHY GROUP

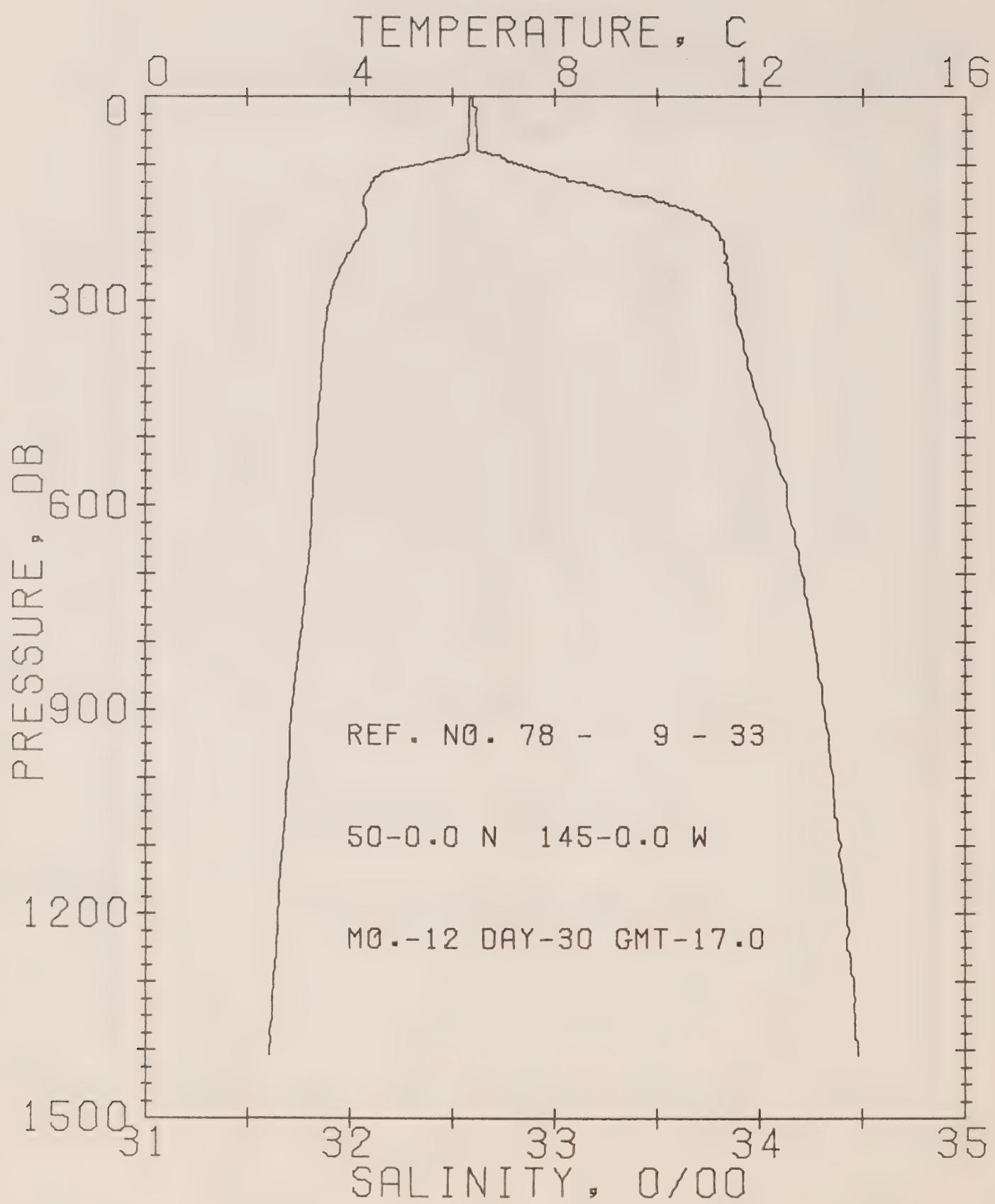
REFERENCE NO. 78- 9- 27 DATE 29/12/78

POSITION 50- .0N, 145- .0W GMT 16.0 STATION P

RESULTS OF STP CAST 150 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.28	32.61	0	25.66	234.3	.00	.00	1473.
10	6.28	32.60	10	25.65	235.2	.23	.01	1473.
20	6.29	32.60	20	25.65	235.1	.47	.05	1473.
30	6.30	32.61	30	25.65	234.9	.71	.11	1474.
50	6.31	32.60	50	25.65	235.7	1.18	.30	1474.
75	6.33	32.61	75	25.65	236.2	1.77	.68	1474.
100	5.13	32.80	99	25.99	203.5	2.33	1.18	1470.
125	4.46	33.06	124	26.22	181.6	2.81	1.73	1468.
150	4.21	33.48	149	26.58	147.7	3.22	2.30	1468.
175	4.29	33.73	174	26.77	129.7	3.56	2.86	1469.
200	4.18	33.81	199	26.84	123.1	3.88	3.47	1469.
225	3.95	33.83	223	26.88	119.5	4.18	4.12	1469.
250	3.83	33.85	248	26.91	117.0	4.48	4.84	1469.
300	3.60	33.88	298	26.96	112.8	5.05	6.45	1469.



OFFSHORE OCEANOGRAPHY GROUP

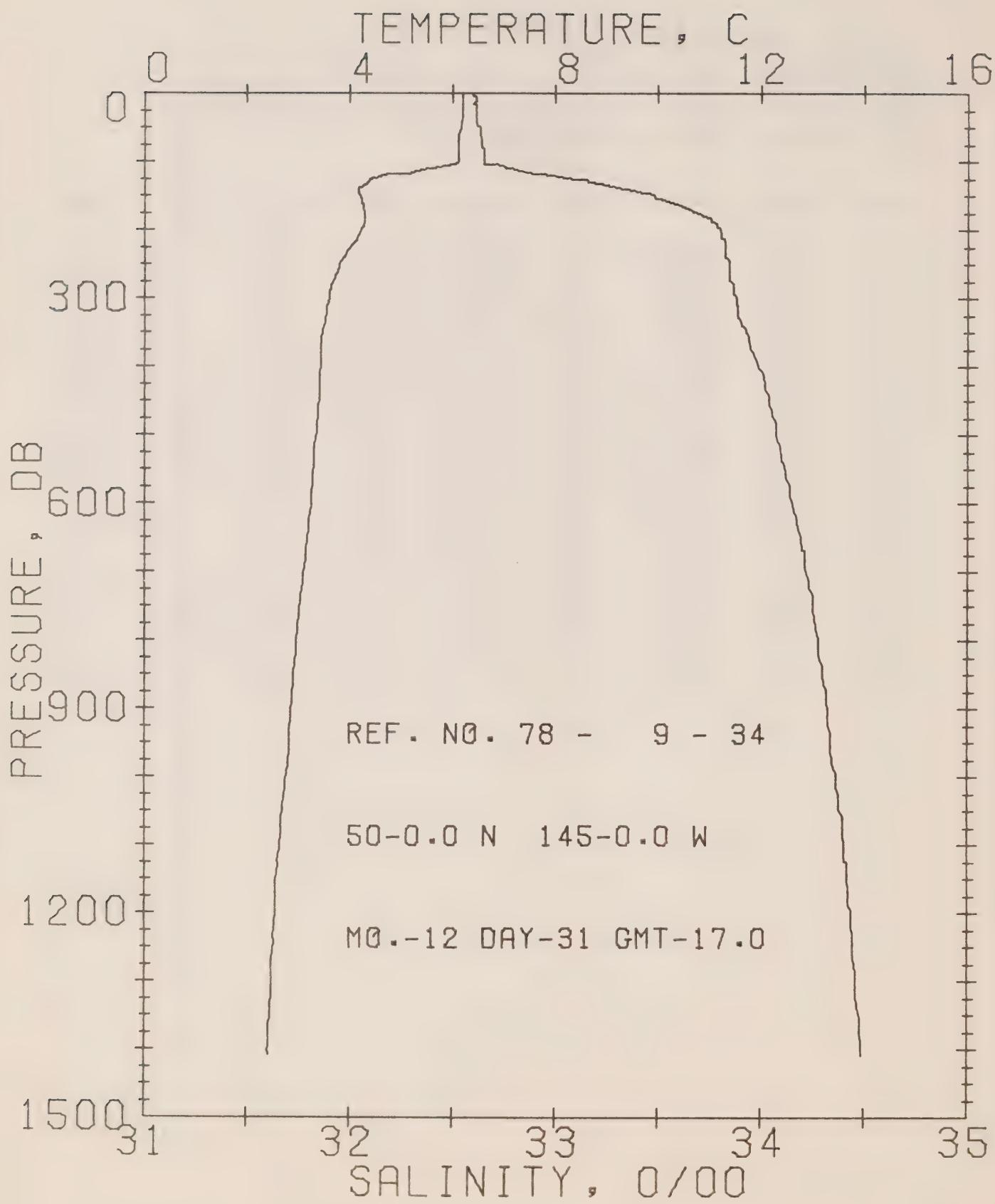
REFERENCE NO. 78- 9- 33 DATE 30/12/78

POSITION 50- .0N, 145- .0W GMT 17.0 STATION P

RESULTS OF STP CAST 295 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.34	32.60	0	25.64	235.8	.00	.00	1473.
10	6.32	32.60	10	25.64	235.6	.24	.01	1473.
20	6.33	32.62	20	25.66	234.5	.47	.05	1474.
30	6.33	32.61	30	25.65	235.2	.71	.11	1474.
50	6.32	32.62	50	25.66	234.7	1.18	.30	1474.
75	6.32	32.62	75	25.66	234.9	1.76	.67	1474.
100	5.28	32.83	99	25.95	207.4	2.32	1.17	1471.
125	4.44	33.11	124	26.26	177.6	2.80	1.72	1468.
150	4.26	33.48	149	26.57	148.3	3.21	2.29	1468.
175	4.33	33.70	174	26.74	132.7	3.56	2.87	1469.
200	4.22	33.80	199	26.83	124.5	3.88	3.49	1469.
225	4.02	33.83	223	26.88	120.2	4.19	4.14	1469.
250	3.82	33.85	248	26.91	116.9	4.49	4.86	1469.
300	3.61	33.88	298	26.96	112.9	5.06	6.47	1469.
400	3.45	33.94	397	27.02	107.3	6.16	10.39	1470.
500	3.36	34.05	496	27.12	99.1	7.19	15.11	1471.
600	3.26	34.13	595	27.19	92.8	8.14	20.45	1472.
800	3.02	34.27	793	27.32	81.2	9.88	32.81	1475.
1000	2.79	34.36	990	27.42	73.2	11.42	46.88	1477.
1200	2.60	34.43	1188	27.49	67.1	12.83	62.64	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 34

DATE 31/12/78

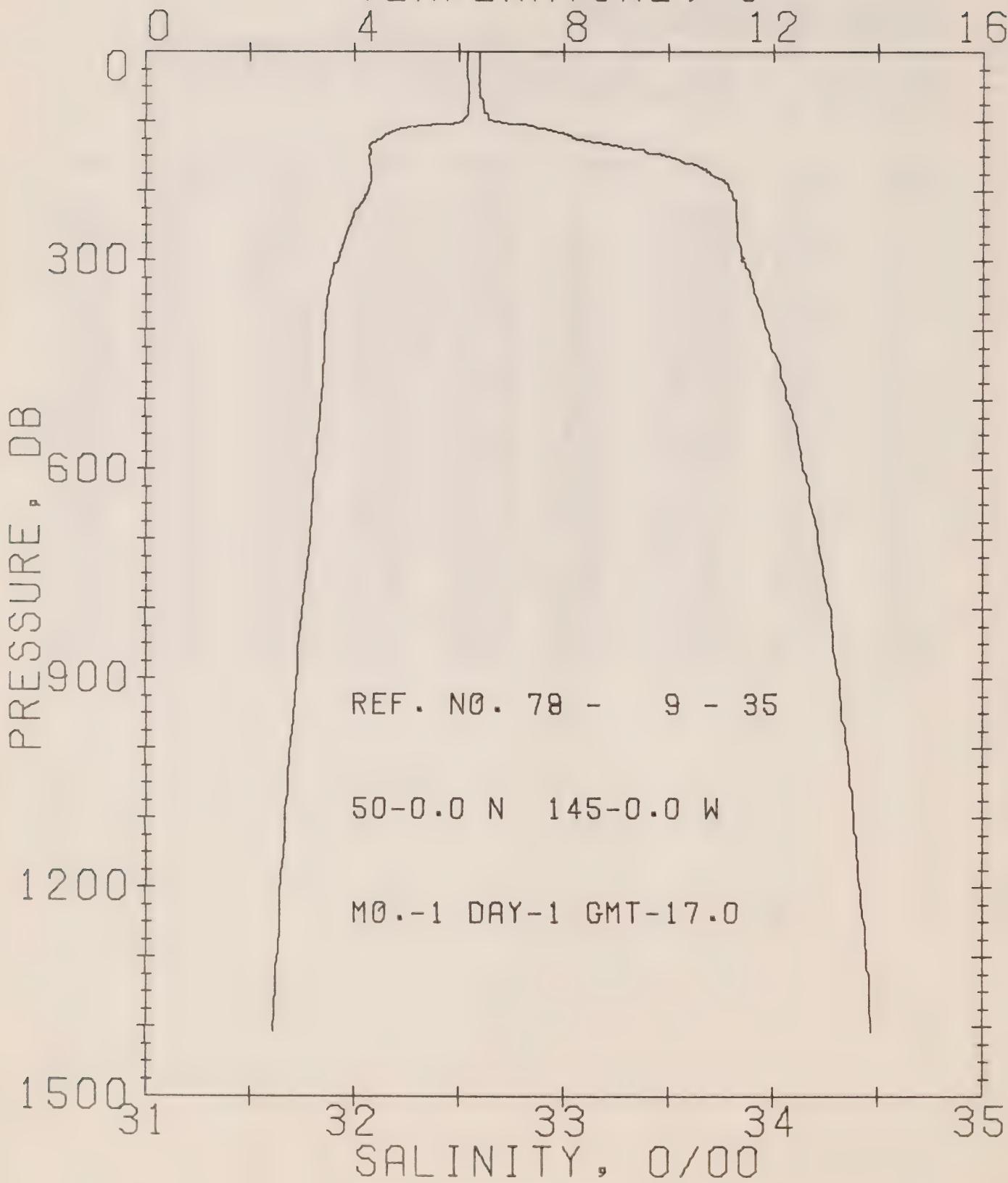
POSITION 50- .0N, 145- .0W GMT 17.0 STATION P

RESULTS OF STP CAST 306 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.19	32.59	0	25.65	234.7	.00	.00	1473.
10	6.19	32.61	10	25.67	233.3	.23	.01	1473.
20	6.20	32.61	20	25.67	233.6	.47	.05	1473.
30	6.19	32.61	30	25.67	233.6	.70	.11	1473.
50	6.16	32.63	50	25.69	231.9	1.17	.30	1473.
75	6.11	32.64	75	25.70	230.9	1.75	.67	1474.
100	6.10	32.65	99	25.71	230.2	2.32	1.18	1474.
125	4.42	33.08	124	26.24	179.7	2.84	1.77	1468.
150	4.21	33.48	149	26.58	147.7	3.25	2.34	1468.
175	4.29	33.69	174	26.74	133.0	3.60	2.92	1469.
200	4.22	33.80	199	26.83	124.3	3.92	3.53	1469.
225	4.00	33.83	223	26.88	120.0	4.23	4.19	1469.
250	3.80	33.85	248	26.92	116.7	4.52	4.91	1469.
300	3.60	33.88	298	26.96	112.8	5.10	6.52	1469.
400	3.44	33.99	397	27.06	104.0	6.18	10.39	1470.
500	3.35	34.07	496	27.13	97.5	7.18	14.97	1471.
600	3.24	34.15	595	27.21	91.3	8.12	20.24	1472.
800	2.97	34.28	793	27.34	79.9	9.83	32.36	1475.
1000	2.76	34.37	990	27.43	72.2	11.35	46.33	1477.
1200	2.55	34.44	1188	27.50	65.8	12.73	61.76	1480.

60

TEMPERATURE, C



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 35 DATE 1/ 1/79

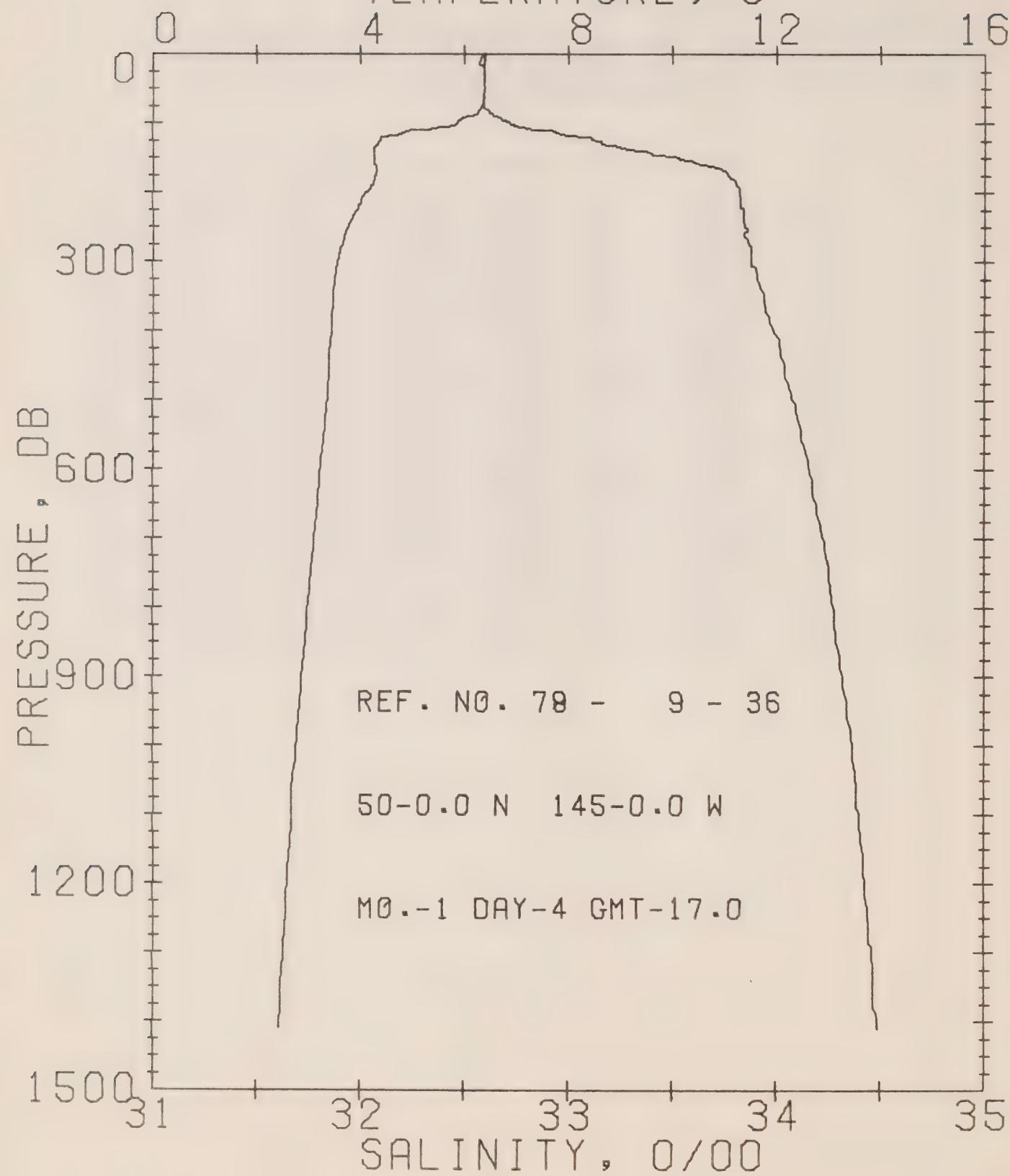
POSITION 50- .0N, 145- .0W GMT 17.0 STATION P

RESULTS OF STP CAST 284 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.15	32.60	0	25.66	233.5	.00	.00	1473.
10	6.16	32.60	10	25.66	233.7	.23	.01	1473.
20	6.16	32.60	20	25.66	233.8	.47	.05	1473.
30	6.17	32.60	30	25.66	234.1	.70	.11	1473.
50	6.19	32.59	50	25.65	235.0	1.17	.30	1473.
75	6.17	32.61	75	25.67	233.9	1.76	.67	1474.
100	6.02	32.68	99	25.74	227.1	2.34	1.19	1474.
125	4.48	33.05	124	26.21	182.5	2.83	1.76	1468.
150	4.28	33.49	149	26.58	147.7	3.24	2.33	1468.
175	4.31	33.69	174	26.74	133.2	3.59	2.90	1469.
200	4.25	33.80	199	26.83	125.0	3.91	3.51	1470.
225	4.03	33.82	223	26.87	121.0	4.22	4.18	1469.
250	3.90	33.83	248	26.89	119.1	4.52	4.91	1469.
300	3.68	33.85	298	26.93	115.9	5.11	6.55	1469.
400	3.42	33.97	397	27.05	105.2	6.20	10.45	1470.
500	3.36	34.06	496	27.13	98.2	7.21	15.09	1471.
600	3.24	34.14	595	27.20	91.9	8.16	20.37	1472.
800	2.99	34.28	793	27.33	80.4	9.88	32.61	1475.
1000	2.76	34.36	990	27.41	73.3	11.42	46.73	1477.
1200	2.58	34.42	1188	27.48	67.9	12.83	62.54	1480.

TEMPERATURE, C



OFFSHORE OCEANOGRAPHY GROUP

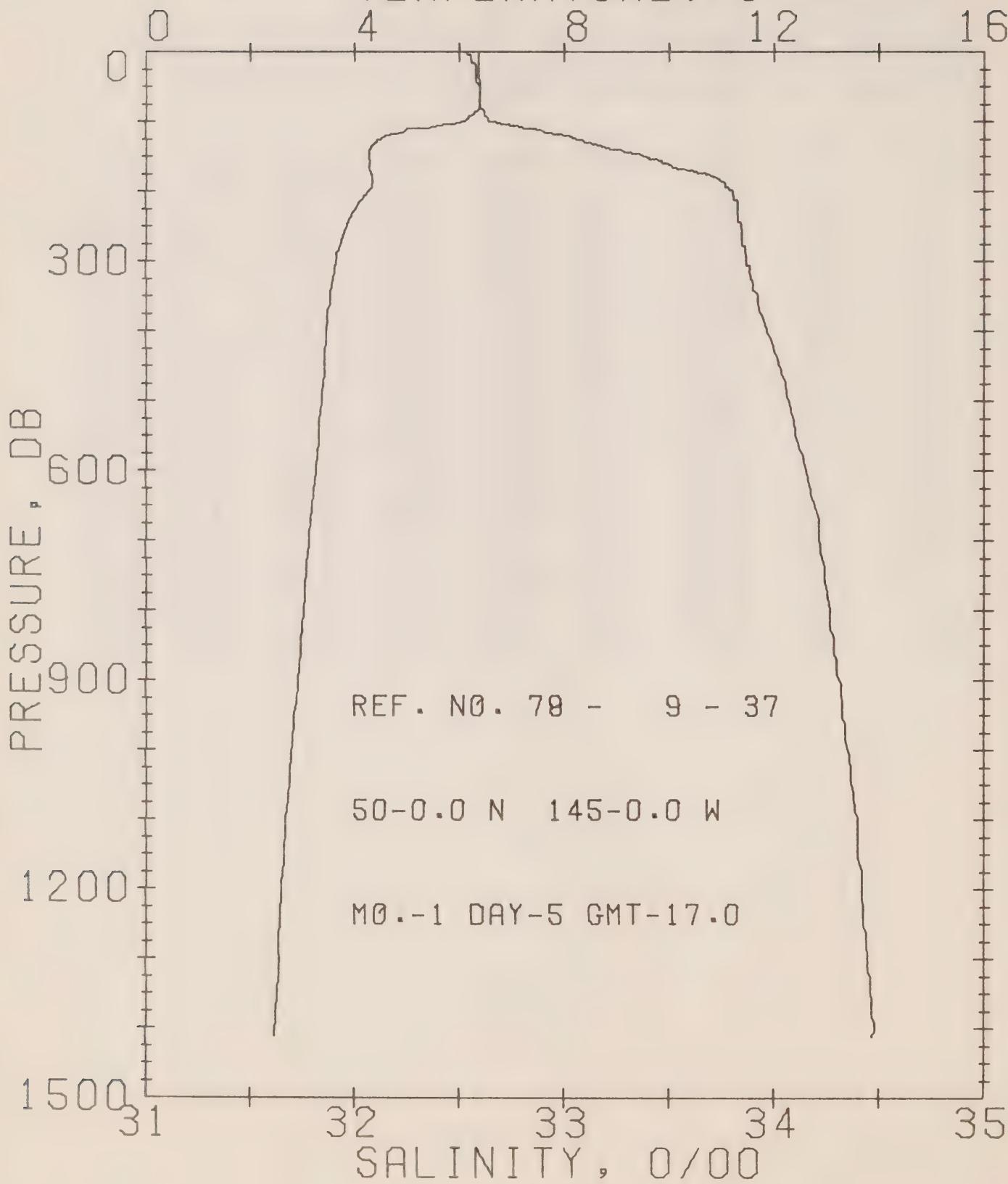
REFERENCE NO. 78- 9- 36 DATE 4/ 1/79

POSITION 50- .0N, 145- .0W GMT 17.0 STATION P

RESULTS OF STP CAST 294 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.40	32.59	0	25.62	237.2	.00	.00	1474.
10	6.39	32.58	10	25.62	238.0	.24	.01	1474.
20	6.38	32.59	20	25.63	237.2	.48	.05	1474.
30	6.38	32.60	30	25.64	236.6	.71	.11	1474.
50	6.39	32.60	50	25.63	237.0	1.19	.30	1474.
75	6.33	32.59	75	25.63	237.3	1.78	.68	1474.
100	5.85	32.71	99	25.79	222.9	2.36	1.20	1473.
125	4.36	33.13	124	26.29	175.3	2.86	1.76	1468.
150	4.27	33.52	149	26.61	145.4	3.26	2.33	1468.
175	4.29	33.77	174	26.80	127.0	3.60	2.89	1469.
200	4.10	33.82	199	26.86	121.6	3.91	3.48	1469.
225	3.93	33.84	223	26.89	118.5	4.21	4.13	1469.
250	3.75	33.85	248	26.92	116.2	4.50	4.84	1468.
300	3.56	33.88	298	26.96	112.4	5.07	6.44	1468.
400	3.43	33.90	397	27.06	104.0	6.15	10.27	1470.
500	3.35	34.08	496	27.14	97.0	7.15	14.86	1471.
600	3.21	34.16	595	27.22	90.3	8.09	20.10	1472.
800	2.98	34.26	793	27.33	80.3	9.79	32.22	1475.
1000	2.75	34.37	990	27.43	72.2	11.32	46.24	1477.
1200	2.58	34.43	1188	27.49	66.9	12.72	61.85	1480.

TEMPERATURE, C



OFFSHORE OCEANOGRAPHY GROUP

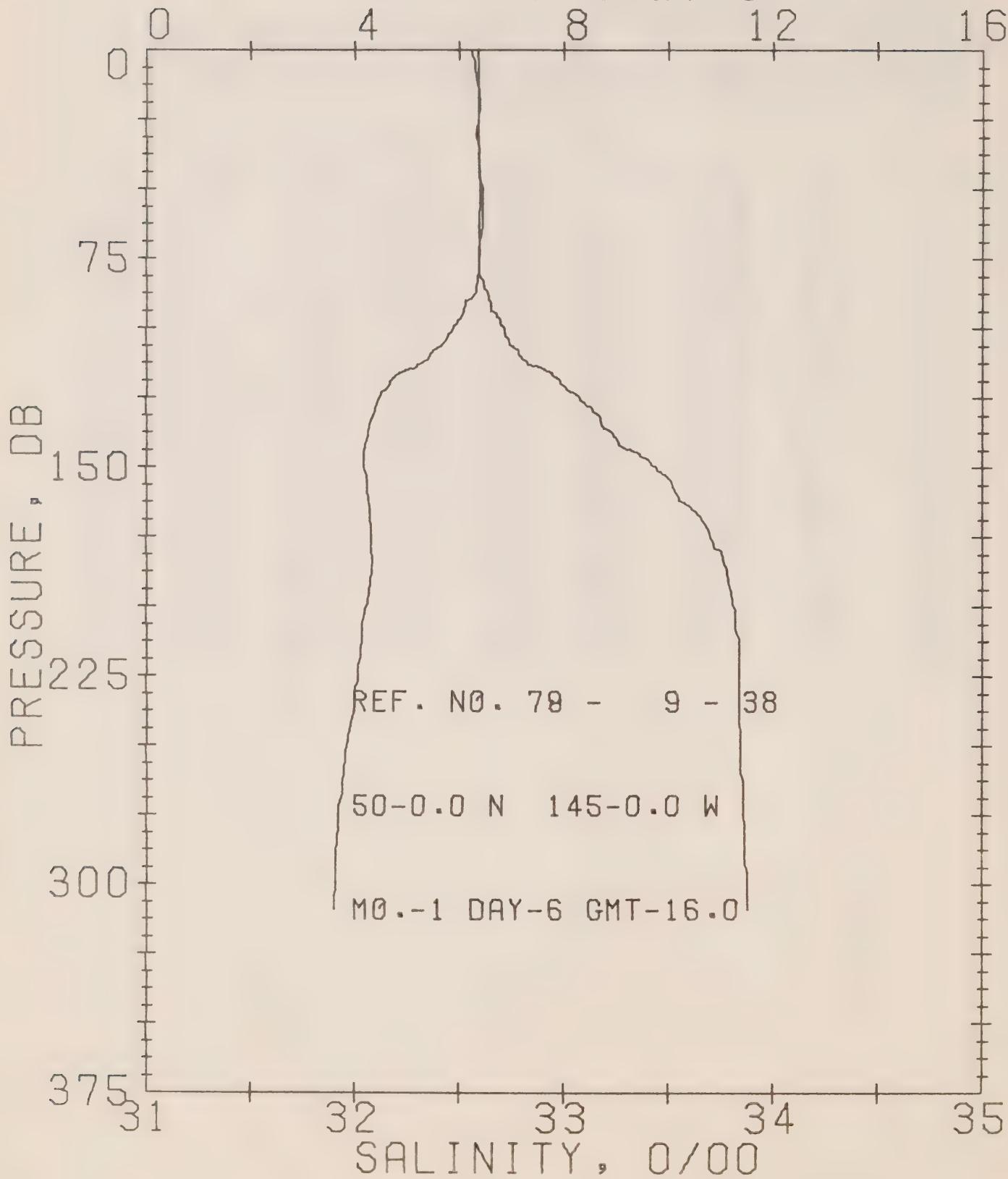
REFERENCE NO. 78- 9- 37 DATE 5/ 1/79

POSITION 50- .0N, 145- .0W GMT 17.0 STATION P

RESULTS OF STP CAST 277 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.37	32.52	0	25.57	242.1	.00	.00	1473.
10	6.37	32.55	10	25.60	240.0	.24	.01	1473.
20	6.38	32.58	20	25.62	238.0	.48	.05	1474.
30	6.37	32.58	30	25.62	238.0	.72	.11	1474.
50	6.39	32.60	50	25.63	237.2	1.19	.30	1474.
75	6.38	32.60	75	25.63	237.3	1.79	.68	1475.
100	6.03	32.66	99	25.73	228.7	2.37	1.20	1474.
125	4.49	33.06	124	26.22	181.9	2.88	1.78	1468.
150	4.28	33.38	149	26.49	155.9	3.30	2.38	1468.
175	4.33	33.67	174	26.72	135.0	3.67	2.98	1469.
200	4.25	33.80	199	26.83	125.0	3.99	3.60	1470.
225	4.00	33.83	223	26.88	120.0	4.30	4.26	1469.
250	3.83	33.84	248	26.90	117.7	4.60	4.98	1469.
300	3.63	33.87	298	26.95	113.9	5.17	6.60	1469.
400	3.45	33.96	397	27.04	105.9	6.27	10.51	1470.
500	3.35	34.07	496	27.13	97.7	7.29	15.15	1471.
600	3.24	34.15	595	27.21	91.2	8.23	20.45	1472.
800	3.00	34.27	793	27.32	81.1	9.95	32.66	1475.
1000	2.79	34.35	990	27.41	73.9	11.50	46.88	1477.
1200	2.59	34.42	1188	27.48	67.8	12.91	62.65	1480.

TEMPERATURE, C



## OFFSHORE OCEANOGRAPHY GROUP

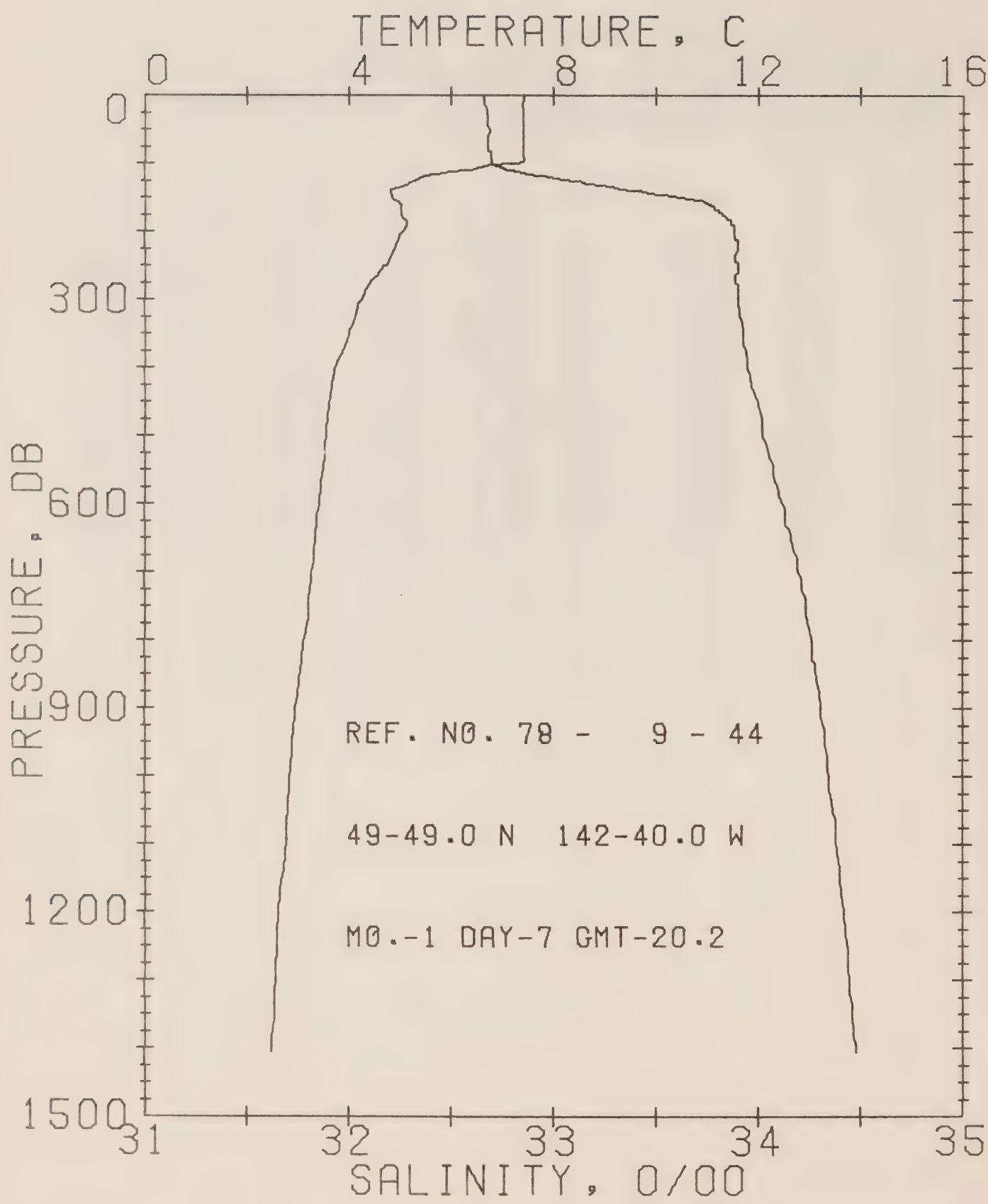
REFERENCE NO. 76- 9- 38 DATE 6/ 1/79

POSITION 50- .0N, 145- .0W GMT 16.0 STATION P

RESULTS OF STP CAST 159 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.36	32.56	0	25.61	239.0	.00	.00	1473.
10	6.37	32.58	10	25.62	237.7	.24	.01	1474.
20	6.38	32.60	20	25.63	236.6	.48	.05	1474.
30	6.37	32.58	30	25.62	237.8	.71	.11	1474.
50	6.39	32.61	50	25.64	236.2	1.19	.30	1474.
75	6.38	32.59	75	25.63	237.9	1.78	.68	1475.
100	5.86	32.71	99	25.79	223.0	2.36	1.20	1473.
125	4.46	33.07	124	26.23	180.8	2.87	1.78	1468.
150	4.17	33.44	149	26.55	150.3	3.29	2.36	1468.
175	4.32	33.70	174	26.74	132.6	3.64	2.94	1469.
200	4.22	33.82	199	26.85	123.1	3.96	3.55	1469.
225	4.05	33.84	223	26.88	119.7	4.26	4.21	1469.
250	3.84	33.85	248	26.91	117.1	4.56	4.92	1469.
300	3.62	33.88	298	26.96	113.0	5.13	6.53	1469.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 44

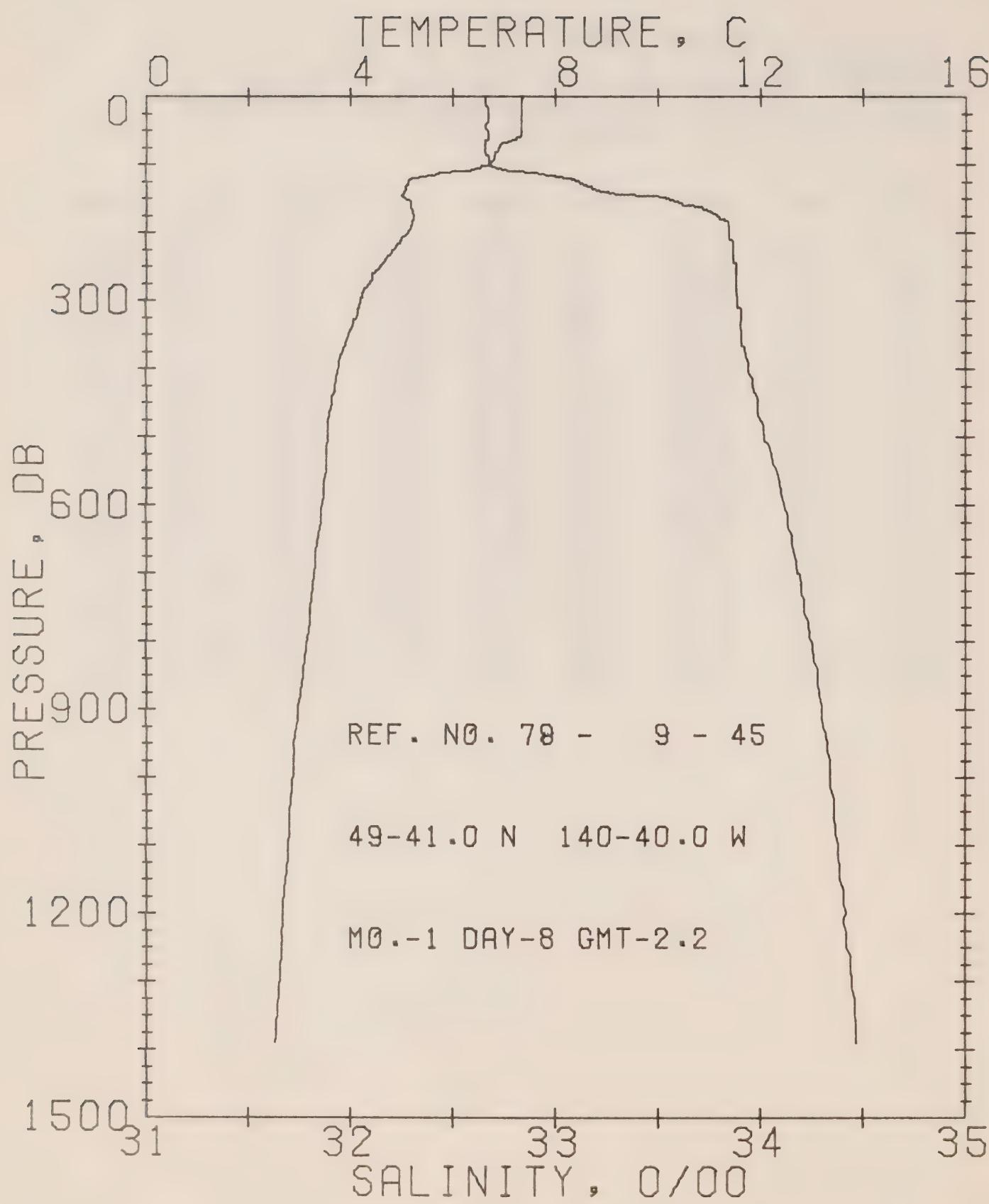
DATE 7/ 1/79

POSITION 49-49.0N, 142-40.0W GMT 20.2 STATION 12

RESULTS OF STP CAST 291 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.41	32.66	0	25.55	244.8	.00	.00	1478.
10	7.40	32.66	10	25.55	244.8	.24	.01	1478.
20	7.41	32.67	20	25.55	244.3	.49	.05	1478.
30	7.41	32.67	30	25.56	244.2	.73	.11	1478.
50	7.42	32.68	50	25.56	244.1	1.22	.31	1478.
75	7.42	32.68	75	25.56	244.5	1.83	.70	1479.
100	7.16	32.69	99	25.60	240.6	2.44	1.24	1478.
125	5.29	33.08	124	26.15	189.0	2.98	1.86	1472.
150	4.86	33.62	149	26.62	144.1	3.40	2.44	1471.
175	5.05	33.82	174	26.76	131.5	3.73	3.00	1472.
200	5.04	33.88	199	26.81	127.2	4.06	3.61	1473.
225	4.89	33.90	223	26.84	124.3	4.37	4.29	1473.
250	4.71	33.90	248	26.86	122.5	4.68	5.04	1472.
300	4.23	33.90	298	26.91	117.8	5.28	6.72	1471.
400	3.73	33.95	397	27.00	109.6	6.42	10.77	1471.
500	3.55	34.02	496	27.07	103.3	7.47	15.62	1472.
600	3.41	34.11	595	27.16	95.5	8.47	21.18	1473.
800	3.11	34.26	793	27.31	82.6	10.24	33.82	1475.
1000	2.84	34.35	990	27.40	74.7	11.81	48.16	1477.
1200	2.62	34.42	1188	27.48	68.1	13.24	64.17	1480.



OFFSHORE OCEANOGRAPHY GROUP

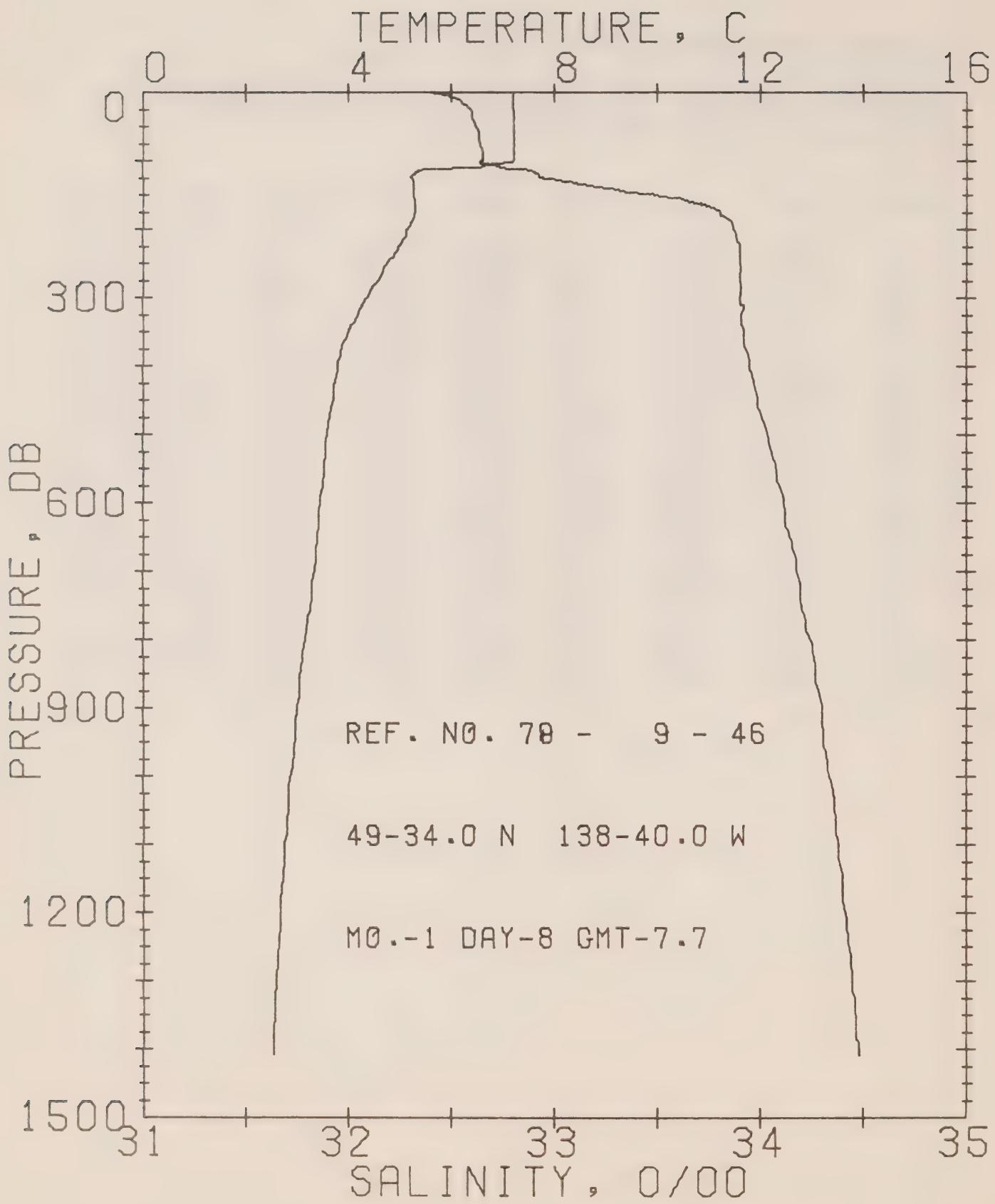
REFERENCE NO. 78- 9- 45 DATE 8/ 1/79

POSITION 49-41.0N, 140-40.0W GMT 2.2 STATION 11

RESULTS OF STP CAST 344 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.35	32.66	0	25.55	244.0	.00	.00	1477.
10	7.34	32.66	10	25.56	244.0	.24	.01	1477.
20	7.34	32.67	20	25.56	243.4	.49	.05	1478.
30	7.33	32.67	30	25.56	243.4	.73	.11	1478.
50	7.34	32.66	50	25.56	244.2	1.22	.31	1478.
75	6.90	32.66	75	25.61	239.5	1.82	.70	1477.
100	6.69	32.67	99	25.65	236.1	2.42	1.23	1476.
125	5.13	33.11	124	26.19	185.0	2.95	1.83	1471.
150	5.10	33.54	149	26.53	152.8	3.38	2.44	1472.
175	5.24	33.79	174	26.71	135.9	3.74	3.03	1473.
200	5.12	33.85	199	26.77	130.3	4.07	3.66	1473.
225	4.84	33.87	223	26.82	126.0	4.39	4.35	1473.
250	4.56	33.88	248	26.86	122.4	4.70	5.11	1472.
300	4.19	33.89	298	26.91	118.1	5.30	6.79	1471.
400	3.74	33.94	397	26.99	110.5	6.45	10.86	1471.
500	3.54	34.02	496	27.07	103.4	7.51	15.74	1472.
600	3.43	34.11	595	27.16	95.9	8.50	21.30	1473.
800	3.14	34.25	793	27.29	84.2	10.30	34.09	1475.
1000	2.87	34.34	990	27.39	75.6	11.88	48.58	1478.
1200	2.67	34.42	1188	27.47	68.7	13.33	64.77	1480.



OFFSHORE OCEANOGRAPHY GROUP

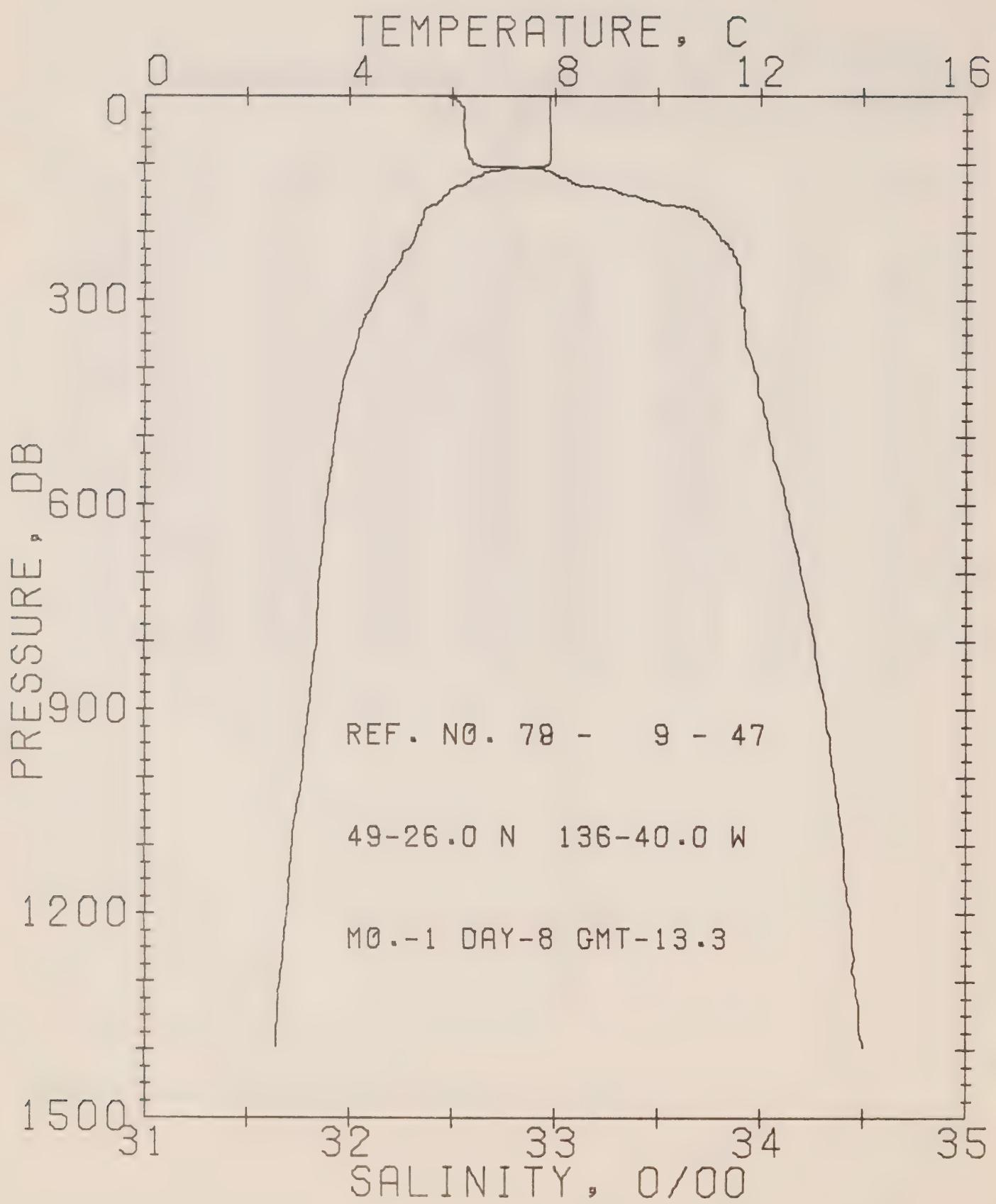
REFERENCE NO. 78- 9- 46 DATE 8/ 1/79

POSITION 49-34.0N, 138-40.0W GMT 7.7 STATION 10

RESULTS OF STP CAST 252 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.20	32.40	0	25.37	261.4	.00	.00	1476.
10	7.20	32.53	10	25.47	251.9	.26	.01	1477.
20	7.21	32.57	20	25.50	249.1	.51	.05	1477.
30	7.22	32.60	30	25.52	247.2	.75	.11	1477.
50	7.23	32.61	50	25.53	246.5	1.25	.32	1478.
75	7.23	32.64	75	25.55	244.9	1.86	.71	1478.
100	7.19	32.65	99	25.57	244.0	2.47	1.25	1478.
125	5.24	32.95	124	26.05	198.2	3.02	1.87	1471.
150	5.27	33.49	149	26.47	158.4	3.47	2.50	1473.
175	5.30	33.80	174	26.71	135.9	3.83	3.10	1473.
200	5.14	33.87	199	26.79	129.1	4.16	3.73	1473.
225	4.98	33.90	223	26.83	125.3	4.48	4.42	1473.
250	4.74	33.90	248	26.86	122.9	4.79	5.17	1473.
300	4.35	33.90	298	26.90	119.0	5.39	6.86	1472.
400	3.78	33.95	397	27.00	110.2	6.53	10.93	1471.
500	3.57	34.03	496	27.08	102.6	7.60	15.82	1472.
600	3.44	34.11	595	27.16	96.0	8.60	21.39	1473.
800	3.13	34.24	793	27.29	84.4	10.41	34.31	1475.
1000	2.87	34.34	990	27.39	75.8	12.01	48.95	1478.
1200	2.66	34.42	1188	27.47	68.9	13.45	65.12	1480.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 47 DATE 8/ 1/79

POSITION 49-26.0N, 136-40.0W GMT 13.3 STATION 9

RESULTS OF STP CAST 266 POINTS TAKEN FROM ANALOG TRACE  
GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.89	32.47	0	25.33	265.4	.00	.00	1479.
10	7.89	32.53	10	25.38	261.0	.26	.01	1479.
20	7.90	32.56	20	25.40	259.1	.52	.05	1480.
30	7.90	32.56	30	25.40	259.3	.78	.12	1480.
50	7.91	32.56	50	25.39	260.0	1.30	.33	1480.
75	7.92	32.56	75	25.40	260.2	1.95	.75	1481.
100	7.86	32.60	99	25.44	256.8	2.60	1.32	1481.
125	6.32	33.07	124	26.01	201.9	3.15	1.95	1476.
150	5.80	33.41	149	26.35	170.1	3.61	2.60	1475.
175	5.44	33.70	174	26.61	145.2	4.00	3.24	1474.
200	5.30	33.78	199	26.70	137.2	4.36	3.91	1474.
225	5.12	33.86	223	26.78	129.9	4.69	4.64	1474.
250	4.91	33.90	248	26.84	124.7	5.01	5.41	1473.
300	4.48	33.90	298	26.88	120.5	5.62	7.12	1472.
400	3.96	33.97	397	26.99	110.6	6.77	11.23	1472.
500	3.71	34.04	496	27.08	103.5	7.84	16.12	1473.
600	3.53	34.12	595	27.16	96.1	8.84	21.71	1473.
800	3.35	34.27	793	27.29	85.0	10.65	34.59	1476.
1000	3.06	34.36	990	27.39	76.2	12.26	49.31	1476.
1200	2.77	34.44	1188	27.48	68.3	13.70	65.44	1481.

TEMPERATURE, C

4

8

12

16

PRESSURE, DB

600

900

1200

1500

REF. NO. 78 - 9 - 48

49-17.0 N 134-40.0 W

MO.-1 DAY-8 GMT-19.0

SALINITY, P/PO

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REFERENCE NO. 78- 9- 48

DATE 8/ 1/79

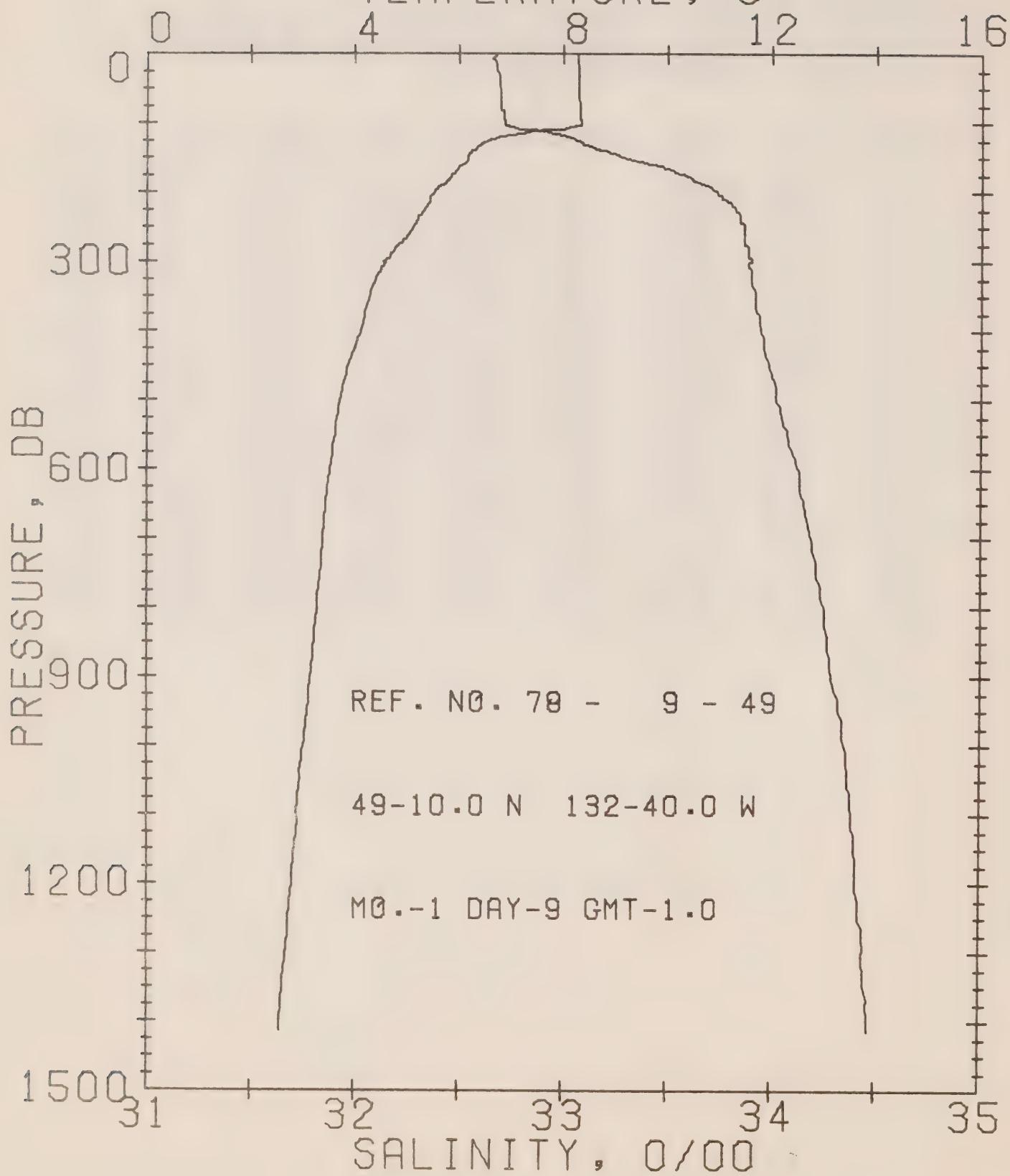
POSITION 49-17.0N, 134-40.0W GMT 19.0 STATION 8

RESULTS OF STP CAST 334 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.58	32.49	0	25.39	259.7	.00	.00	1478.
10	7.58	32.49	10	25.39	259.8	.26	.01	1478.
20	7.59	32.49	20	25.39	260.1	.52	.05	1478.
30	7.59	32.49	30	25.39	260.3	.78	.12	1479.
50	7.60	32.49	50	25.39	260.5	1.30	.33	1479.
75	7.62	32.49	75	25.38	261.2	1.95	.75	1479.
100	7.63	32.50	99	25.39	261.0	2.61	1.33	1480.
125	6.65	32.98	124	25.90	212.8	3.20	2.00	1477.
150	6.24	33.28	149	26.19	185.6	3.70	2.71	1476.
175	6.00	33.57	174	26.45	161.3	4.13	3.42	1476.
200	5.86	33.77	199	26.62	145.3	4.51	4.15	1476.
225	5.68	33.86	223	26.72	136.2	4.86	4.91	1476.
250	5.43	33.91	248	26.78	130.0	5.20	5.72	1475.
300	5.06	33.91	298	26.83	126.2	5.84	7.51	1475.
400	4.36	33.95	397	26.94	116.3	7.04	11.79	1473.
500	3.85	34.01	496	27.04	107.2	8.15	16.89	1473.
600	3.57	34.10	595	27.13	98.6	9.18	22.63	1474.
800	3.28	34.26	793	27.29	84.9	11.00	35.55	1476.
1000	2.95	34.35	990	27.39	75.8	12.61	50.34	1478.
1200	2.73	34.42	1188	27.47	69.3	14.07	66.66	1480.

TEMPERATURE, C



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 49 DATE 9/ 1/79

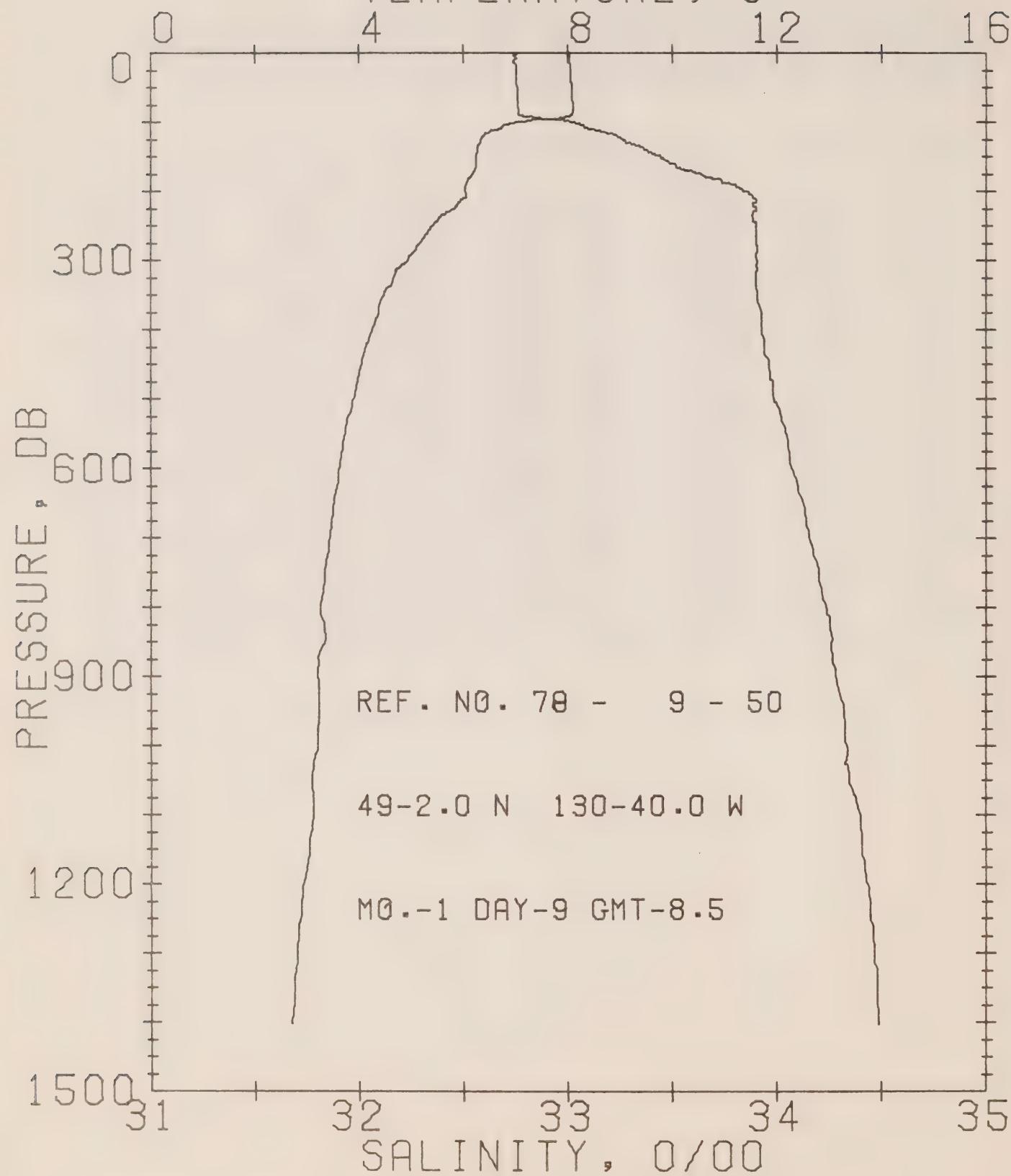
POSITION 49-10.0N, 132-40.0W GMT 1.0 STATION 7

RESULTS OF STP CAST 304 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.27	32.67	0	25.43	255.8	.00	.00	1481.
10	8.27	32.66	10	25.43	256.3	.26	.01	1481.
20	8.29	32.68	20	25.43	255.6	.51	.05	1481.
30	8.29	32.69	30	25.44	255.2	.77	.12	1482.
50	8.30	32.69	50	25.44	255.2	1.28	.33	1482.
75	8.32	32.70	75	25.45	255.4	1.92	.73	1482.
100	8.35	32.72	99	25.46	254.8	2.55	1.30	1483.
125	6.55	33.06	124	25.98	205.6	3.13	1.96	1477.
150	6.16	33.29	149	26.21	183.9	3.62	2.64	1476.
175	5.86	33.57	174	26.47	159.2	4.05	3.35	1475.
200	5.52	33.73	199	26.63	143.9	4.43	4.07	1475.
225	5.33	33.82	223	26.73	135.3	4.77	4.83	1474.
250	5.11	33.87	248	26.79	129.3	5.10	5.63	1474.
300	4.55	33.90	298	26.88	121.2	5.73	7.39	1473.
400	4.11	33.95	397	26.96	113.6	6.91	11.58	1472.
500	3.72	34.02	496	27.06	105.1	8.00	16.57	1473.
600	3.53	34.12	595	27.16	96.1	9.01	22.20	1473.
800	3.27	34.25	793	27.28	85.6	10.82	35.14	1476.
1000	3.01	34.35	990	27.39	76.3	12.45	50.05	1478.
1200	2.79	34.41	1188	27.46	70.7	13.91	66.41	1481.

## TEMPERATURE, C



OFFSHORE OCEANOGRAPHY GROUP

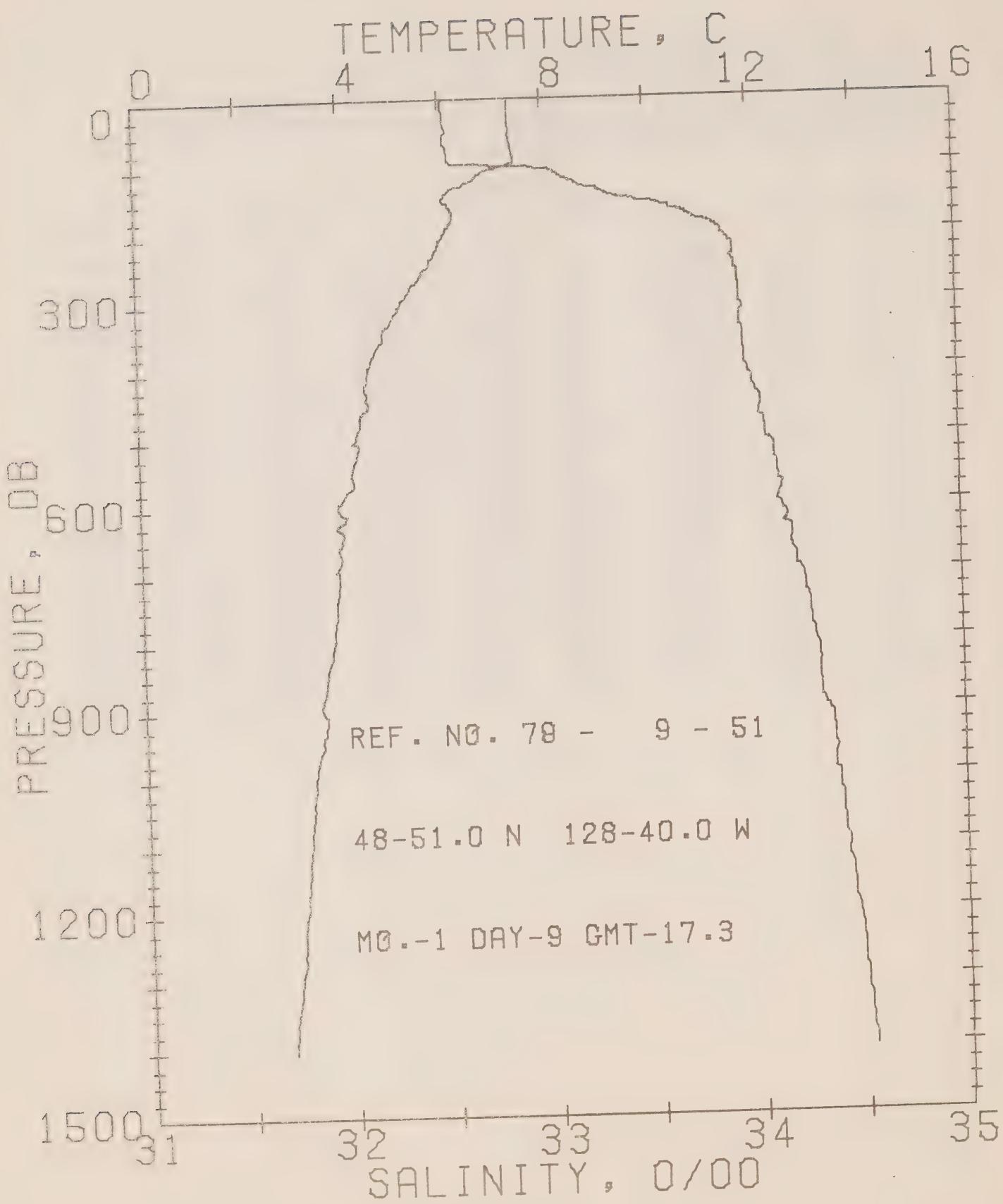
REFERENCE NO. 78- 9- 50 DATE 9/ 1/79

POSITION 49- 2.0N, 130-40.0W GMT 8.5 STATION 6

RESULTS OF STP CAST 334 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	8.04	32.75	0	25.53	246.6	.00	.00	1480.
10	8.04	32.74	10	25.52	247.1	.25	.01	1480.
20	8.05	32.75	20	25.52	247.0	.49	.05	1481.
30	8.05	32.75	30	25.52	247.2	.74	.11	1481.
50	8.07	32.76	50	25.53	247.0	1.24	.32	1481.
75	8.10	32.76	75	25.53	247.9	1.85	.71	1482.
100	7.02	33.02	99	25.88	214.2	2.46	1.25	1478.
125	6.33	33.26	124	26.16	188.0	2.96	1.82	1476.
150	6.24	33.44	149	26.32	173.2	3.41	2.45	1476.
175	6.16	33.64	174	26.48	158.1	3.83	3.14	1477.
200	6.03	33.84	199	26.66	141.9	4.20	3.86	1477.
225	5.81	33.90	223	26.73	135.0	4.55	4.60	1477.
250	5.40	33.90	248	26.78	130.4	4.88	5.40	1475.
300	4.93	33.91	298	26.84	124.8	5.52	7.19	1474.
400	4.24	33.93	397	26.93	116.5	6.72	11.48	1473.
500	3.90	33.99	496	27.01	109.5	7.85	16.65	1473.
600	3.62	34.07	595	27.11	101.1	8.89	22.49	1474.
800	3.25	34.23	793	27.27	86.3	10.76	35.77	1476.
1000	3.19	34.34	991	27.36	79.3	12.42	50.96	1479.
1200	2.92	34.43	1188	27.46	70.4	13.92	67.77	1481.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 51 DATE 9/ 1/79

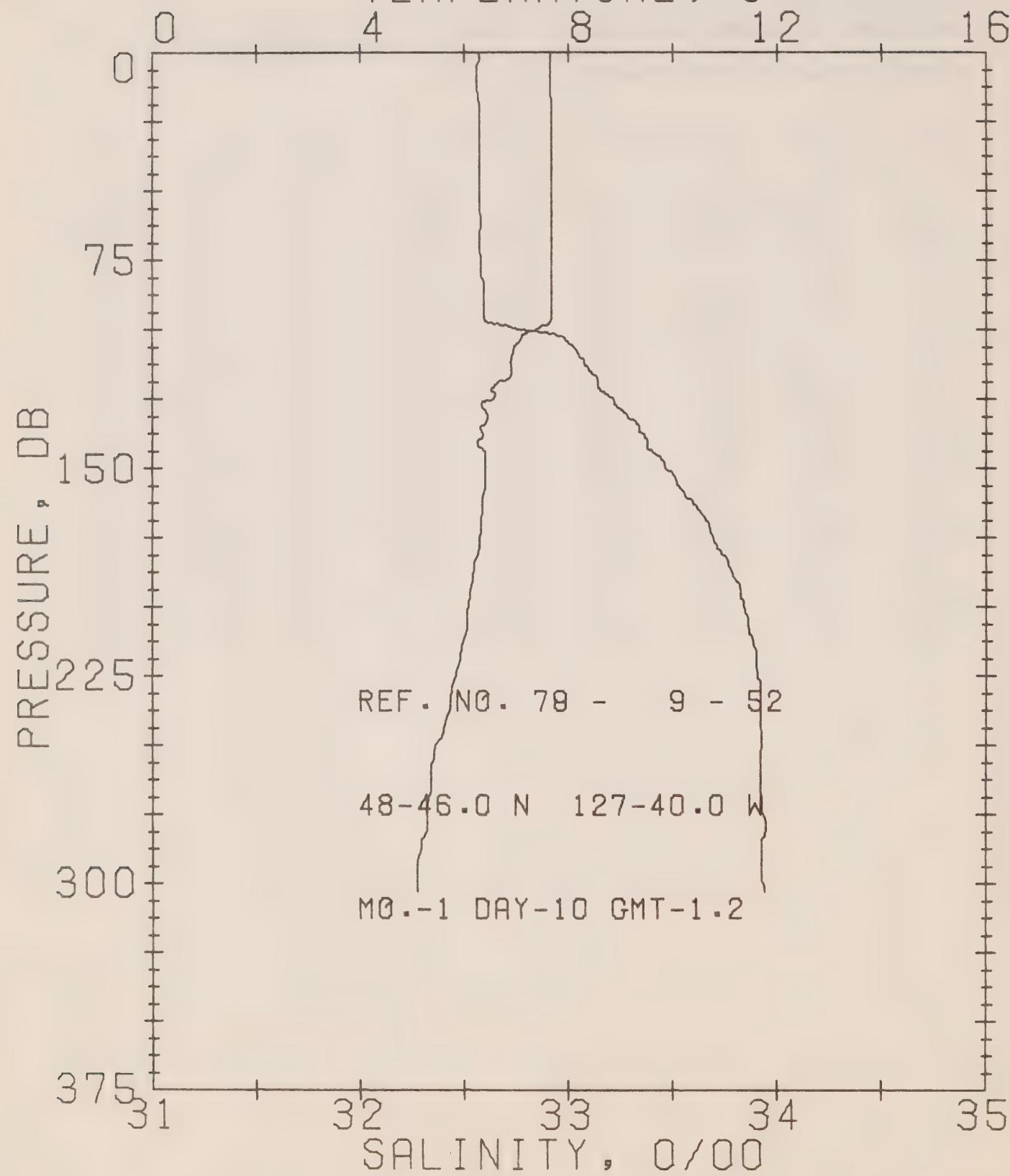
POSITION 48-51.0N, 128-40.0W GMT 17.3 STATION 5

RESULTS OF STP CAST 433 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.36	32.51	0	25.43	255.3	.00	.00	1477.
10	7.36	32.51	10	25.43	255.4	.26	.01	1477.
20	7.36	32.52	20	25.44	255.0	.51	.05	1478.
30	7.36	32.52	30	25.44	255.0	.77	.12	1478.
50	7.38	32.53	50	25.45	254.8	1.28	.32	1478.
75	7.43	32.53	75	25.44	255.7	1.91	.73	1479.
100	7.17	32.92	99	25.78	223.6	2.55	1.30	1479.
125	6.47	33.16	124	26.06	197.0	3.06	1.89	1477.
150	6.03	33.43	149	26.33	171.8	3.53	2.53	1476.
175	6.23	33.71	174	26.53	153.8	3.93	3.20	1477.
200	6.03	33.87	199	26.68	139.7	4.29	3.90	1477.
225	5.87	33.92	223	26.74	134.3	4.64	4.64	1477.
250	5.67	33.93	248	26.77	131.4	4.97	5.44	1476.
300	5.17	33.95	298	26.85	124.5	5.61	7.23	1475.
400	4.50	33.98	397	26.94	116.0	6.81	11.51	1474.
500	4.23	34.06	496	27.04	107.6	7.93	16.63	1475.
600	3.85	34.12	595	27.12	100.0	8.96	22.42	1475.
800	3.72	34.28	793	27.27	87.7	10.83	35.73	1478.
1000	3.28	34.39	991	27.39	76.4	12.48	50.79	1479.
1200	3.04	34.47	1188	27.48	69.1	13.94	67.23	1482.

## TEMPERATURE, C



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REFERENCE NO. 78- 9- 52

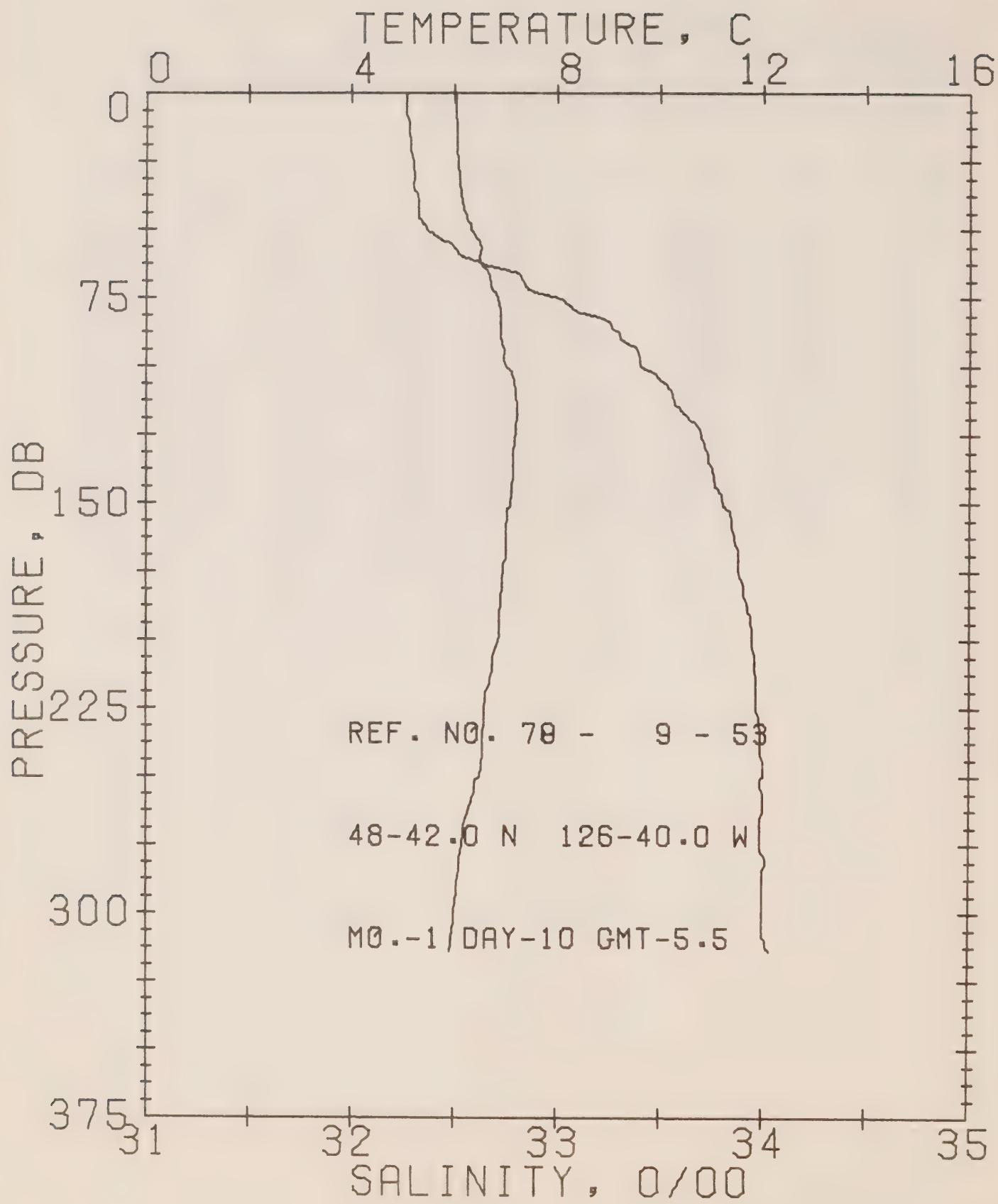
DATE 10/ 1/79

POSITION 48-46.0N, 127-40.0W GMT 1.2 STATION 4

RESULTS OF STP CAST 180 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED,PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	7.65	32.56	0	25.43	255.4	.00	.00	1478.
10	7.66	32.56	10	25.43	255.7	.26	.01	1479.
20	7.67	32.57	20	25.44	255.2	.51	.05	1479.
30	7.67	32.57	30	25.44	255.4	.77	.12	1479.
50	7.68	32.57	50	25.44	255.9	1.28	.33	1479.
75	7.69	32.58	75	25.44	255.6	1.92	.73	1480.
100	7.39	32.75	99	25.62	239.2	2.55	1.30	1479.
125	6.55	33.21	124	26.09	194.4	3.07	1.90	1477.
150	6.39	33.47	149	26.32	173.3	3.53	2.53	1477.
175	6.30	33.69	174	26.50	156.1	3.94	3.21	1477.
200	6.06	33.84	199	26.65	142.1	4.31	3.92	1477.
225	5.83	33.91	223	26.74	134.5	4.66	4.67	1477.
250	5.45	33.93	248	26.80	128.8	4.99	5.47	1476.
300	5.09	33.93	298	26.84	124.7	5.62	7.25	1475.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 53

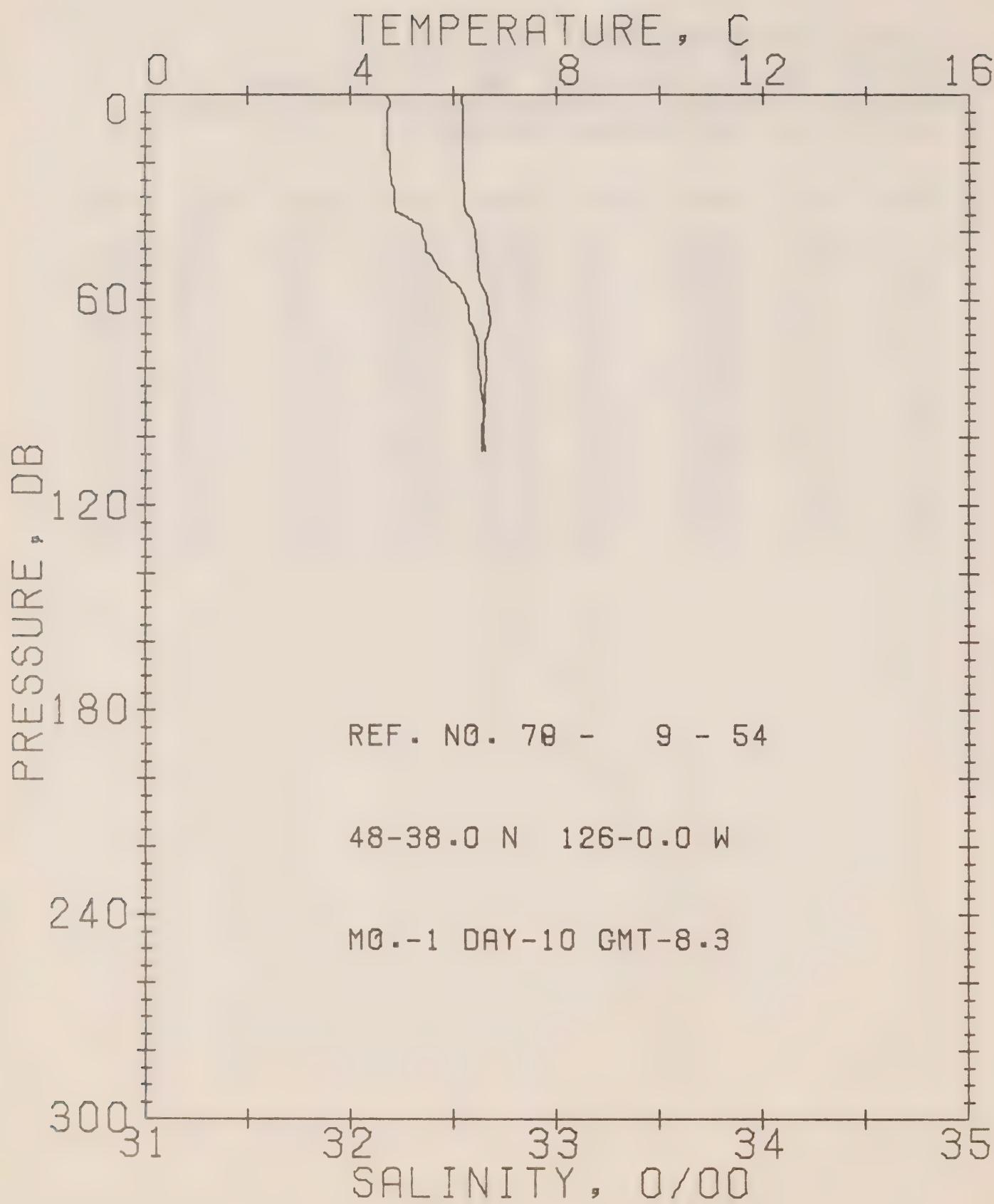
DATE 10/ 1/79

POSITION 48-42.0N, 126-40.0W GMT 5.5 STATION 3

RESULTS OF STP CAST 198 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.02	32.27	0	25.42	256.7	.00	.00	1472.
10	6.04	32.28	10	25.42	256.5	.26	.01	1472.
20	6.06	32.29	20	25.43	255.9	.51	.05	1472.
30	6.10	32.31	30	25.44	254.9	.77	.12	1472.
50	6.33	32.37	50	25.46	253.4	1.28	.33	1474.
75	6.85	33.00	75	25.89	213.2	1.87	.70	1477.
100	7.01	33.41	99	26.19	185.1	2.35	1.13	1479.
125	7.19	33.70	124	26.39	166.3	2.79	1.63	1480.
150	7.09	33.81	149	26.49	157.1	3.20	2.20	1480.
175	6.96	33.88	174	26.56	150.5	3.58	2.83	1480.
200	6.86	33.95	199	26.63	144.4	3.95	3.53	1480.
225	6.60	33.97	223	26.68	139.8	4.30	4.30	1480.
250	6.50	34.00	248	26.72	136.6	4.65	5.14	1480.
300	6.00	34.00	298	26.78	131.0	5.31	7.00	1479.



OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 54

DATE 10/ 1/79

POSITION 48-38.0N, 126- .0W GMT 8.3 STATION 2

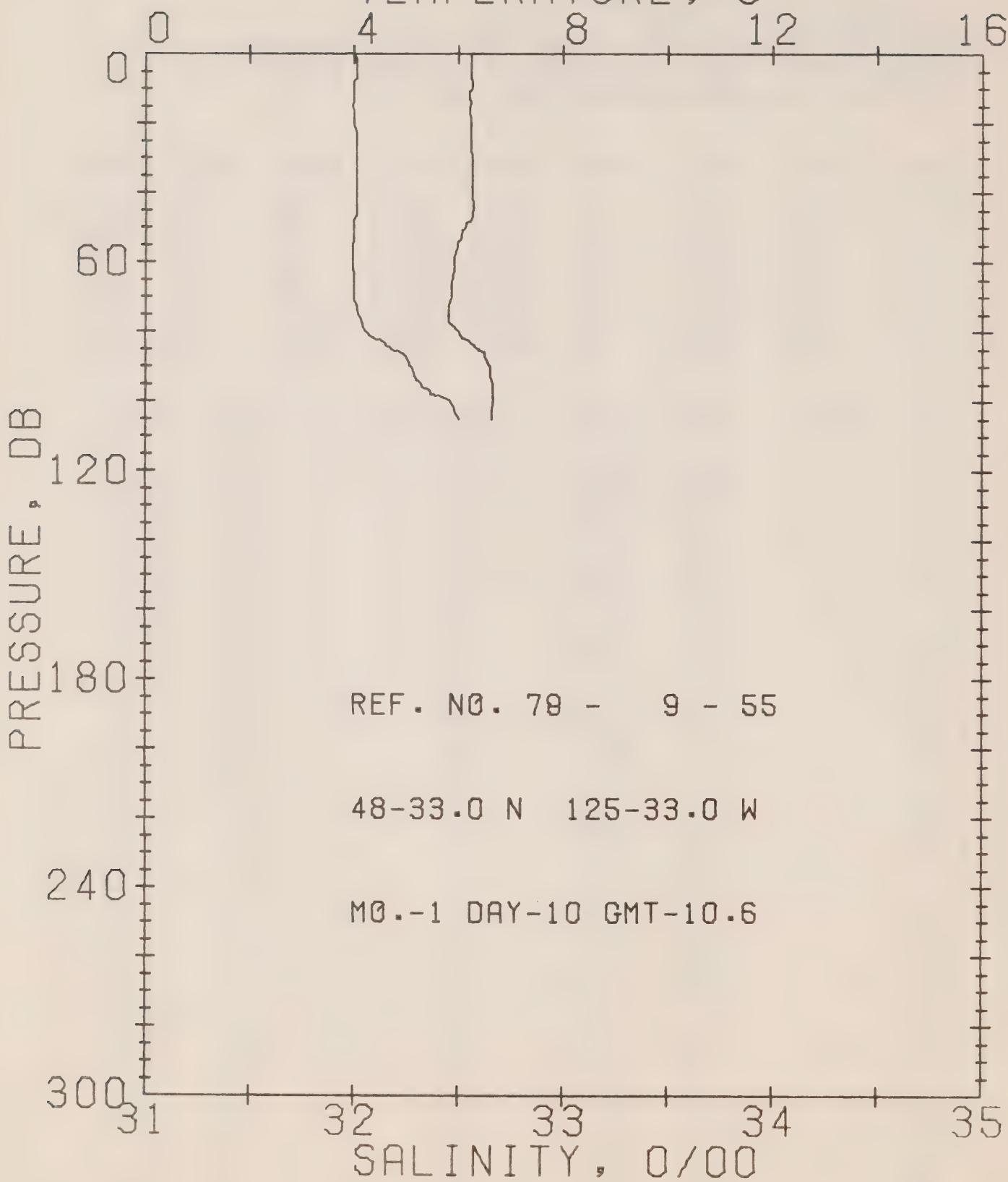
RESULTS OF STP CAST 68 POINTS TAKEN FROM ANALOG TRACE

GUIDELINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.18	32.17	0	25.32	266.0	.00	.00	1472.
10	6.18	32.18	10	25.33	265.4	.27	.01	1472.
20	6.19	32.19	20	25.34	264.9	.53	.05	1472.
30	6.22	32.21	30	25.35	263.8	.79	.12	1473.
50	6.49	32.42	50	25.48	251.6	1.31	.33	1474.
75	6.62	32.62	75	25.62	238.6	1.92	.72	1476.
100	6.60	32.64	99	25.64	237.2	2.51	1.25	1476.

PRES	DEPTH	TEMP	SAL	PRES	DEPTH	TEMP	SAL
0.		6.18	32.17	53.		6.50	32.47
1.		6.17	32.18	54.		6.51	32.48
2.		6.17	32.19	56.		6.57	32.52
3.		6.18	32.19	57.		6.60	32.53
5.		6.19	32.18	58.		6.63	32.54
6.		6.19	32.18	59.		6.66	32.55
7.		6.18	32.18	61.		6.68	32.56
11.		6.18	32.18	62.		6.69	32.57
12.		6.18	32.18	63.		6.70	32.57
16.		6.19	32.18	65.		6.72	32.57
17.		6.19	32.19	66.		6.72	32.57
20.		6.19	32.19	67.		6.72	32.58
22.		6.19	32.19	68.		6.69	32.59
23.		6.19	32.19	70.		6.66	32.60
25.		6.20	32.20	71.		6.63	32.61
26.		6.21	32.20	72.		6.61	32.61
28.		6.22	32.21	73.		6.61	32.62
29.		6.22	32.21	74.		6.62	32.62
31.		6.22	32.21	75.		6.62	32.62
32.		6.22	32.21	77.		6.64	32.62
34.		6.24	32.22	78.		6.64	32.62
35.		6.29	32.25	80.		6.64	32.62
36.		6.36	32.28	83.		6.63	32.63
37.		6.38	32.31	85.		6.62	32.63
38.		6.41	32.34	86.		6.62	32.63
40.		6.42	32.35	89.		6.61	32.64
41.		6.43	32.35	92.		6.60	32.65
44.		6.45	32.37	94.		6.59	32.65
45.		6.46	32.37	97.		6.59	32.64
46.		6.46	32.37	98.		6.60	32.64
47.		6.47	32.39	100.		6.60	32.64
48.		6.48	32.40	102.		6.58	32.64
49.		6.48	32.41	103.		6.57	32.65
51.		6.49	32.43	104.		6.57	32.65

TEMPERATURE, C



## OFFSHORE OCEANOGRAPHY GROUP

REFERENCE NO. 78- 9- 55

DATE 10/ 1/79

POSITION 48-33.0N, 125-33.0W GMT 10.6 STATION 1

RESULTS OF STP CAST 73 POINTS TAKEN FROM ANALOG TRACE

GUILDLINE WAS USED, PRESSURES ARE INPUT

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	DELTA D	POT. EN	SOUND
0	6.25	32.00	0	25.18	279.6	.00	.00	1472.
10	6.27	32.00	10	25.18	279.9	.28	.01	1472.
20	6.23	32.00	20	25.18	279.5	.56	.06	1472.
30	6.26	32.01	30	25.19	279.3	.84	.13	1473.
50	6.13	32.00	50	25.19	278.7	1.40	.36	1472.
75	5.81	32.02	75	25.25	273.7	2.09	.80	1472.
100	6.67	32.46	99	25.49	251.5	2.75	1.39	1476.

PRES	DEPTH	TEMP	SAL	PRES	DEPTH	TEMP	SAL
0.		6.25	32.00	57.		5.95	31.99
2.		6.25	32.01	59.		5.93	31.99
4.		6.25	32.01	61.		5.92	31.99
6.		6.25	32.01	62.		5.91	31.99
7.		6.25	32.01	64.		5.89	32.00
8.		6.26	32.00	66.		5.88	32.00
10.		6.27	32.00	67.		5.87	32.00
11.		6.21	32.00	70.		5.86	32.00
12.		6.21	32.00	71.		5.85	32.00
13.		6.21	32.00	73.		5.82	32.01
14.		6.23	32.00	74.		5.81	32.01
15.		6.22	31.99	75.		5.81	32.02
17.		6.22	32.00	77.		5.82	32.03
19.		6.23	32.00	78.		5.86	32.04
20.		6.23	32.00	79.		5.91	32.04
21.		6.24	32.00	81.		6.05	32.07
23.		6.25	32.01	82.		6.09	32.09
25.		6.25	32.01	83.		6.21	32.13
26.		6.25	32.01	84.		6.29	32.15
27.		6.25	32.01	85.		6.38	32.18
31.		6.27	32.01	86.		6.48	32.22
33.		6.28	32.01	87.		6.51	32.24
35.		6.28	32.01	88.		6.54	32.25
38.		6.28	32.01	89.		6.57	32.26
41.		6.28	32.01	90.		6.61	32.27
44.		6.29	32.01	91.		6.62	32.28
45.		6.29	32.01	93.		6.62	32.29
46.		6.28	32.01	94.		6.64	32.30
47.		6.27	32.01	95.		6.66	32.32
48.		6.23	32.00	96.		6.66	32.33
49.		6.16	32.00	97.		6.67	32.36
50.		6.13	32.00	98.		6.68	32.37
51.		6.09	32.00	99.		6.67	32.43
53.		6.04	32.00	100.		6.67	32.46
54.		6.01	32.00	103.		6.65	32.48
55.		5.98	31.99	105.		6.65	32.50



Surface Salinity and Temperature Observations  
(P-78-9)

SURFACE SALINITY AND TEMPERATURE OBSERVATIONS  
CRUISE REFERENCE NUMBER 78- 9

DATE/TIME				SALINITY	TEMP	LONGITUDE
YR	MO	DY	GMT	0/00	C	WEST
78	12	1	1800	31.912		123-30
78	12	1	1900	31.776		124- 0
78	12	1	2025	31.309		124-30
78	12	1	2245	31.917		125- 0
78	12	1	2330	31.695	8.3	125-33
78	12	1	2330	31.778*	8.3	125-33
78	12	2	126	32.152	9.7	126- 0
78	12	2	126	32.184*	9.7	126- 0
78	12	2	345	32.106	9.4	126-40
78	12	2	345	32.152*	9.4	126-40
78	12	2	715	32.175	10.2	127-40
78	12	2	715	32.207*	10.2	127-40
78	12	2	1015	32.235	10.9	128-40
78	12	2	1015	32.254*	10.9	128-40
78	12	2	1340	32.250		129-40
78	12	2	1630	32.575	11.2	130-40
78	12	2	1920	32.560		131-40
78	12	2	2200	32.644	11.2	132-40
78	12	3	140	32.401		133-40
78	12	3	430	32.494	10.5	134-40
78	12	3	1030	32.524	10.2	136-40
78	12	3	1405	32.584		137-40
78	12	3	1700	32.596	9.3	138-40
78	12	3	2040	32.624		139-40
78	12	4	0	32.552	8.8	140-40
78	12	4	405	32.603		141-40
78	12	4	600	32.612	9.3	142-40
78	12	4	1700		8.2	145- 0
78	12	5	0	32.520	8.2	145- 0
78	12	6	0	32.532	8.1	145- 0
78	12	7	0	32.534	8.4	145- 0
78	12	8	0	32.520	8.6	143-44
78	12	9	0	32.760	11.2	136- 8
78	12	10	0	32.829	12.1	131-11
78	12	11	0	32.644	10.4	136-54
78	12	12	0	32.586	9.1	142-37
78	12	13	0	32.531	8.0	145- 0
78	12	14	0	32.547	7.8	ON STATION
78	12	15	0	32.549	7.9	ON STATION
78	12	16	0	32.551	7.5	ON STATION
78	12	17	0	32.601	7.0	ON STATION
78	12	18	0	32.609	7.0	ON STATION
78	12	19	0	32.568	7.6	ON STATION
78	12	20	0	32.580	7.2	ON STATION

SURFACE SALINITY AND TEMPERATURE OBSERVATIONS  
CRUISE REFERENCE NUMBER 78- 9

DATE/TIME YR MO DY	GMT	SALINITY	TEMP C	LONGITUDE WEST
78 12 21	0	32.582	7.3	ON STATION
78 12 22	0	32.569	7.6	ON STATION
78 12 23	0	32.562	7.5	ON STATION
78 12 26	0	32.575	7.4	ON STATION
78 12 24	0	32.576	7.4	ON STATION
78 12 25	0	32.584	7.3	ON STATION
78 12 26	0	32.575	7.4	ON STATION
78 12 27	0	32.595	7.3	ON STATION
78 12 28	0	32.585	7.3	ON STATION
78 12 29	0	32.579	7.2	ON STATION
78 12 30	0	32.575	7.2	ON STATION
78 12 31	0	32.571	7.3	ON STATION
79 1 1	0	32.571	7.2	ON STATION
79 1 2	0	32.578	7.2	ON STATION
79 1 3	0	32.564	7.5	ON STATION
79 1 4	0	32.572	7.3	ON STATION
79 1 5	0	32.578	7.3	ON STATION
79 1 6	0	32.574	7.2	ON STATION
79 1 7	0	32.564	7.3	145- 0
79 1 7	1640	32.605		143-40
79 1 7	2010	32.625	8.2	142-40
79 1 7	2330	32.601		141-40
79 1 8	210	32.604	8.2	140-40
79 1 8	510	32.639		139-40
79 1 8	740	32.611	8.0	138-40
79 1 8	1045	32.621		137-40
79 1 8	1320	32.502	8.6	136-40
79 1 8	1630	32.526		135-40
79 1 8	1900		8.5	134-40
79 1 8	2212			ON STATION
79 1 9	100	32.625	7.3	ON STATION
79 1 9	505	32.688		ON STATION
79 1 9	830	32.686	8.8	ON STATION
79 1 9	1406	32.443		ON STATION
79 1 9	1715	32.472	8.2	ON STATION
79 1 9	1715	32.473*	8.2	ON STATION
79 1 10	110	32.524	9.0	ON STATION
79 1 10	110	32.529*	9.0	ON STATION
79 1 10	530	32.248	7.0	ON STATION
79 1 10	530	32.254*	7.0	ON STATION
79 1 10	815	32.160	7.6	126- 0
79 1 10	815	32.154*	7.6	126- 0
79 1 10	1035	31.924	7.0	125-33
79 1 10	1035	31.971*	7.0	125-33

SURFACE SALINITY AND TEMPERATURE OBSERVATIONS  
CRUISE REFERENCE NUMBER 79- 9

DATE/TIME			SALINITY	TEMP	LONGITUDE	
YR	MO	DY	GMT	0/00	C	WEST
79	1	10	1235	32.382		125- 0
79	1	10	1400	32.456		124-30
79	1	10	1520	32.229		124- 0
79	1	10	1630	31.419		123-30

\* DENOTES SALINITY SAMPLE TAKEN FROM A  
BUCKET. ALL OTHER SAMPLES TAKEN FROM  
THE SEAWATER LOOP

LIST OF OMISSIONS FROM DATASTD OBSERVATIONS:

Consecutive numbers 28-32 and 39-43 are part of the Mixed Layer Experiment (MILE) and are reported elsewhere.







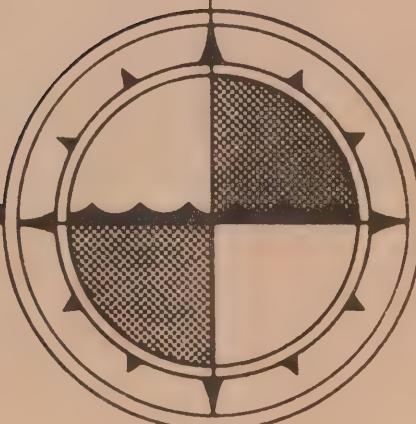
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# THE SUBMARINE SLIDE OF 27 APRIL, 1975 IN KITIMAT INLET AND THE WATER WAVES THAT ACCOMPANIED THE SLIDE

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KITIMAT INLET AND THE WATER WAVES THAT ACCOMPANIED THE SLIDE

by

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This is a manuscript which has received only limited circulation. On citing this report in a bibliography the title should be followed by the words "UNPUBLISHED MANUSCRIPT" which is in accordance with accepted bibliographic custom.

ABSTRACT.

A major submarine slide occurred on April 27, 1975 in Kitimat Inlet in the Douglas Channel system on the West Coast of Canada. Following this slide, at least two water waves were observed and it was estimated that the range (crest to trough) of the first wave could have been 8.2 m. Two simple theories have been used here to estimate the wave height. Considering the uncertainties both in the observed data as well as in the calculated wave height, there is reasonable agreement. A visual description of the area under consideration before and after the slide, and also the results of certain laboratory experiments by Hecate Strait Engineering are included.



## 1. INTRODUCTION.

Kitimat Inlet on the West Coast of British Columbia (Figure 1.1) has a history of landslides: several slides occurred during the period 1952 to 1968, and also in 1971. On October 17, 1974, following a submarine slide, a water wave of 2.8 m amplitude was generated. On April 27, 1975, following a major slide, water waves with ranges up to 8.2 m were generated. In other parts of British Columbia, also, major slides occur - for example, in Howe Sound, in 1955. Other parts of Canada where slides have occurred are Alberta and the St. Lawrence River valley in Quebec (Murty, 1977; Murty and Durvasula, 1977).

Other parts of the globe have also recorded histories of slides: Alaska, Oregon, California, Mississippi, The Netherlands, Norway, Switzerland, Italy, New Zealand, U.S.S.R., Japan, Peru, Fiji and China. Two dramatic examples of water-wave generation due to land-slides are Lituya Bay, Alaska and Viamont valley in Italy. In the former case, on 9th July 1958, following an earthquake, part of a mountain broke and fell into the bay and caused a wave of amplitude 34 m. In the latter case, on October 9, 1963, a land-slide into a reservoir generated a wave of 70 metres amplitude and drowned 3,000 people.

Depending on the nature of movement of the sediment, a slide will have two components: horizontal and vertical. Usually, one component dominates the other. For theoretical and laboratory studies, it is convenient to distinguish between vertical and horizontal slides, depending upon which component dominates. Another type of classification of slides is: (a) land-slides, (b) submarine or under-water slides. Actually, in several instances, there may be visual manifestations in the surrounding land, even in the case of a submarine slide.

In this report, we concern ourselves specifically with the submarine slide of April 27, 1975 in the Kitimat Inlet. There are visual manifestations of the slide in the Moon Bay area even now, and it was estimated that about  $3 \times 10^6 \text{m}^3$  of material was involved in this bay alone. Casagrande (1977) estimated the total volume of the material involved in the slide that gave rise to the water waves to be about  $10^7 \text{m}^3$ . Based on an examination of the hydrographic charts prepared before and after the slide, and some rough measurements of shore features, Murty (1979) suggested that an upper limit for the total amount of material involved in the whole slide is about  $26 \times 10^6 \text{m}^3$ . Actually, it is not the volume of the material involved in the slide that directly enters into the calculation of the amplitude of the water waves generated. It will be shown later that various factors associated with the slide together determine the amplitude of the waves.

At the time of occurrence of the slide of April 27, 1975, there was no major seismic event reported in that area. Also, there was no meteorological event at that time which could have caused large water-level oscillations.

Hence, there is no doubt that the water waves were generated by the submarine slide. At least two water waves (and possibly three) were generated, and propagated into the connecting bays and channels. The largest wave was estimated to be 8.2 m in range (crest to trough).

Brown (1975) mentions that the first wave was observed at 10:05 a.m. (Pacific Daylight Saving Time) and, at 10:15 a.m., the bottom was visible. The whole water-level disturbance lasted about an hour. In Bish Creek and Clio Bay (Figure 1.1), which are about 8 km from the site of the slide, at least one wave was observed. Some damage occurred in Bish Creek and the range in Clio Bay was estimated to be about 6.7 m. No wave was noted in Sue Bay, probably because of the complicated path needed for the wave to travel into that bay. Although Minette Bay is at the head of the Kitimat Arm, it is an extremely shallow bay (most of the time there is no water in it) and, further, the bay bottom is very rough because of vegetation and tree trunks, and it is quite conceivable that the wave could not have penetrated and travelled in Minette Bay.

In Section 2, the observations and visual manifestations will be discussed. Section 3 is concerned with the question of why submarine slides occur predominantly near the time of tidal low water. Section 4 deals with estimates of the amplitude of the water wave generated, using an analytical theory, and Section 5 deals with an asymptotic theory. Section 6 summarizes the results of laboratory experiments, reported elsewhere in the literature, that are relevant to the present problem, and conclusions are given in Section 7.

## 2. VISUAL MANIFESTATIONS BEFORE AND AFTER THE SLIDE.

Figures 2.1 and 2.2, dated April 9, 1975 show, in part, the Kitimat waterfront prior to the under-water subsidence on April 27, 1975. The old Alcan Wharf was built for the construction of the Kitimat smelter and town site, and ships could tie up along its southeast face during any state of the tide. There were two sheds - one large and one small - on the wharf-head and, outside the sheds and seaward, there was a decked area about 25 feet (7.6 m) wide, with a good approach to the shore. In recent years, the entire wharf was leased to Northland Navigation - and part was sub-leased to Rivtow Straits, which had a large house-barge that was used as offices; the barge, with its own access-ramp, was secured along the eastern approach to the old Alcan wharf.

To the North of the old Alcan wharf-approach, Ocean Cement had a series of dolphins and fender logs, which they used in unloading barges of bulk cement. Adjoining this property, Northland Navigation had a series of dolphins and a barge loading-site with a ramp, a warehouse, freight handling area and workshops, and a large volume of freight was handled through this terminal. In the centre of the northern end of Kitimat Arm, Eurocan Pulp and Paper had a series of piles driven in a North and South line parallel to

their wharf, which formed the eastern side of their boom basin. The Kitimaat (Indian) Village on the northeast side of Kitimat Arm has a standard wharf with floats, and the anchorage is protected by a floating-log breakwater. Rivtow Straits were building a barge-loading site and marshalling yard in Moon Cove. Most of the road had been put in, the loading ramp was nearly completed, work on the marshalling yard was progressing and Rivtow's dredge-barge, "Straits Conveyor" was dredging in the cove and building a breakwater to the south, while their seventy-five by thirty foot (22.9 x 9.1 m) house-barge was secured in the bay.

Two, and possibly three waves were observed in the Kitimat Inlet on April 27, 1975, commencing at 10:05 hours - some 53 minutes after the occurrence of low tide. Eye witnesses described a great depression in the harbour. Figure 2.3 shows a photograph of the water wave, and part of the damage in the Kitimat Arm can be seen in the four photographs taken on April 27, 1975 after the subsidence (Figures 2.4, 2.5, 2.6 & 2.7). Figure 2.8 shows the remains of the old Alcan wharf as of February 23, 1977, and Figure 2.9 shows Moon Cove after the slide.

In Moon Cove, Rivtow's barge-loading site and marshalling area was totally destroyed and their 75 x 30 foot (22.9 x 9.1 m) house-barge was completely demolished; the office barge and tug "V and H" were torn loose and set adrift. The "Straits Conveyor", their dredge barge with two men aboard broke away from its moorings and was set adrift, but was otherwise undamaged and the men unhurt. Two cables mooring a small tug alongside the barge snapped. The seaward half of the old Alcan wharf-head was carried away, and the balance of the wharf-head seriously undermined.

Ocean Cement lost three dolphins and a large fender log, while Northland Navigation lost a new fifteen-pile dolphin, together with four piles from another dolphin, a large navy-type buoy, two anchors and two chains. Eurocan Pulp and Paper lost several multi-pile dolphins on the east side of their boom basin. At the Kitimaat (Indian) village, several fish-boats and dug-outs were extensively damaged (Figure 2.10), and a few were completely wrecked when they were driven under the floats by the waves. A report was received from a fisherman who had anchored his 34-foot (10.4 m) fish-boat in Bish Creek, five miles (8 km) south of Kitimat. This boat twisted like a piece of board in the great turbulent seas before it was grounded for a few minutes - and then refloated. Later, when he went back to pick up his net, the fisherman found it in the form of an unusable solid ball. Another boater reported that he safely got his boat into Clio Bay, six miles (9.6 km) south of Kitimat before the waves passed, carrying with them logs, seaweed and other debris. He estimated the waves to be 20 feet (6.1 m) high. At Kildala Arm, twelve miles (19.2 km) south, boats were washed up on shore and washed out again while, at Sue Channel, twenty miles (32 km) away, there were no visible waves and at Bishop Bay, forty miles (64 km) distant, there was no wave at all.

Figure 2.11 shows the north end of Kitimat Arm, including Moon Cove, as surveyed prior to April 27, 1975, but does not show detailed soundings in the cove. Figure 2.12 shows Moon Cove, as charted from a thorough survey and soundings carried out after the slide. A bathymetric plan of part of Kitimat Arm, as compiled by McElhaney Associates, can be seen in Figure 2.13. The locations where the Casagrande Consultants conducted their investigation into the cause of the slide are shown in Figure 2.14. Although the damage from the subsidence was great, no-one was injured, and there was no loss of life.

### 3. OCCURRENCE OF SUBMARINE SLIDES AT OR CLOSE TO THE TIME OF TIDAL LOW WATER

The Kitimat Submarine Slide of April 27, 1975 occurred approximately 53 minutes after the occurrence of low tide (Figure 3.1). This diagram shows the tidal curve for Kitimat during the period of April 25 to 28, 1975. Since there is no permanent tide-gauge at Kitimat, this curve has been deduced by Casagrande (1977) from the curve for Bella Bella, which is the principal tidal station nearest to Kitimat. There appears to be sufficient observational data to suggest that submarine slides appear in association with low tide.

Table 3.1 lists some slides in Norway. As can be seen, four out of these six slides occurred at or near the time of low tide; for the other two slides, the time of the slide with reference to the state of the tide is not known.

TABLE 3.1 Some Selected Slides in Norway (based on information from Bjerrum, 1971).

Date of Slide	Location of Slide	State of Tide at Time of Slide	Other Information
Apr. 23, 1888	Trondheim Harbour	Low tide	One wave of amplitude 5 to 7 m; width of slide - 600m.
May 2, 1930	Orkdalsfjord	Low tide	25 million cubic metres of material was involved in the slide
Aug. 31, 1940	Finnvika	Low tide	Large water-wave. The effect of the slide on the land could be seen over a length of 5 km.
Apr. 14, 1942	Hommelvika	40 mins after low tide	Length of slide, 450 m.
Oct. 8, 1950	Trondheim Harbr.	Not known	Width of slide, 600m
Jan. 9, 1952	Follafjorden	Not known	

Campbell and Skermer (1975) discussed the mechanism of submarine slides and they attributed this type of slide to shear failure in the soft marine clay. They mention the following factors which might trigger slides in general: excess pore water pressure within clay resulting from extreme low tides, and saturated soil conditions due to run-off from spring snow-melt from higher elevations.

Koppejan *et al.* (1948) discussed the slides in the Netherlands, particularly in the province of Zeeland, during the period 1881 to 1946. At least 229 slides were noted in which the volume of material displaced ranged from 3 to 75 million cubic metres. As for the cause of the submarine slides, these authors state that, for the primary cause, we must look toward the effect of tidal streams on the shore causing a steeper slope than the original safe one, and also to seepage pressures during falling tides diminishing the angle of the safe slope. It is notable that flow slides occur mostly during the period of excessive tide differences, e.g. at spring tides. All the above phenomena have started during ebb-tide, between half-tide and low-water. This conclusion is acceptable since velocities of the current in the channels are largest at half-tide, and seepage pressures are largest at a certain moment during the second half of the ebb-tide.

Mitchell *et al* (1972) discussed the failure of submarine slopes under wind and wave action. Since our concern here is not with the short period, wind-generated waves but with the long period tide, we will not go into the details of this paper. Terzaghi (1925) introduced the concept of temporary excess hydrostatic pressure in fine-grained, cohesionless sediments due to tidal action, and the subsequent occurrence of slides. The failure of a slope occurs when the average shearing stress along the potential surface of sliding equals the average shearing resistance along this surface. For a surface located in a submerged sediment, the shearing resistance,  $S$ , at any point is given by (see Figure 3.2)

$$S = C + (\gamma_s z - u_w) \tan \phi \quad (3.1)$$

where  $C$  is cohesion,  $\gamma_s$  is the submerged unit-weight of the sediment,  $z$  is the depth below the free surface of the sediment,  $u_w$  is the excess hydrostatic pressure in the pore water at the point under discussion, and  $\phi$  is the true angle of internal friction. Note that the cohesion,  $C$ , represents the shearing resistance of the sediment for  $z = 0$ . Terzaghi (1956) explained the slide on the north shore of Howe Sound, British Columbia, of August 22, 1955 as follows :

"If a sediment contains silt, it has the properties of a slightly cohesive material. On sediments of this kind, the slope angle can acquire much higher values than on cohesionless sediments but, as soon as the height of a steep slope exceeds a certain critical value, the slope fails. Furthermore, the permeability of a silty sediment is much smaller than that of clean sand. Therefore, the perched body of silty sediment interfered with the tidal rise and fall of the water table in

the highly permeable sediments on which the body rested. As the tide ebbs, the downward movement of the water table behind the body is retarded, whereby the base of the body of silty material is acted upon by an excess hydrostatic pressure,  $u_w$ . According to (3.1), the pressure  $u_w$  reduces the resistance against sliding. Therefore, the slide occurred at extreme low pressure."

We can assume that a similar reasoning, in terms of the influence of low tide, will also hold for the Kitimat Inlet.

#### 4. ANALYTICAL THEORY.

Following Striem and Miloh (1975), we will assume that the wave generated is of the nature of a solitary wave and use their theoretical arguments to estimate the amplitude of the water wave generated. With reference to Figure 4.1, consider a submarine slide of width  $b$ , depth  $h$  and length  $z$ . As can be seen from the top part of this diagram, at a distance  $L_s$  from the shore, the depth at the centre of gravity of the slide is  $D_s$  and, at distance  $L_o$ , the depth at the end of the slope is  $D_o$ . The potential energy  $E_p$  is

$$E_p = g z b h (\rho_s - \rho_w) (D_o - D_s) \quad (4.1)$$

where  $g$  is gravity, and  $\rho_s$  and  $\rho_w$  respectively, are the densities of the sea-bottom material, and sea water.

Wiegel (1964) showed that the result of a submarine slide will be a single solitary wave. Prins (1958) showed, through laboratory experiments, that, essentially a major solitary wave (followed by a few small waves) is generated. The energy, per unit width of crest, of such a wave is

$$E_w = \frac{g \rho_w}{8\sqrt{3}} (H D)^{3/2} \quad (4.2)$$

where  $H$  is the wave height and  $D$  is the local water depth. The above relation is valid in the two-dimensional case.

In the three-dimensional case, such as in nature, Striem and Miloh (1975) assumed that the wave energy is uniformly distributed over a finite width,  $b$ , which is the width of the slide. It is also assumed that only a fraction  $\mu$  ( $\mu \ll 1$ ) of the potential energy  $E_p$  released by the slide is transformed into wave energy. Then, from (4.1) and (4.2), we get

$$H = \frac{1}{D} [8\sqrt{3} \mu z h (\delta - 1) (D_o - D_s)]^{2/3} \quad (4.3)$$

where

$$\delta \equiv \frac{\rho_s}{\rho_w} \quad (4.4)$$

The relation (4.3) is valid provided that

$$D_s < D < D_o \quad (4.5)$$

The period of the wave generated can be estimated as follows. First of all, one has to assume that the wave exhibits some oscillatory behaviour. Then the general expression for the total wave energy per unit width is

$$E_w = g \rho_w \frac{H^2 \lambda}{8} \quad (4.6)$$

where  $\lambda$  is the wavelength. For the deep-water case, the wave period  $T$  is given by

$$\lambda = \frac{g T^2}{2\pi} \quad (4.7).$$

Since the situation we are dealing with is shallow water, equation (4.7) should be replaced by

$$\lambda = T (gD)^{1/2} \quad (4.8).$$

From the foregoing equations, we get

$$T = \frac{1}{2} \frac{(D^3)^{1/2}}{g} \left[ 9\mu \zeta h (\delta - 1) (D_o - D_s) \right]^{-1/3} \quad (4.9)$$

Thus, equations (4.3) and (4.9), respectively, give the wave height and period of the solitary wave. These expressions are derived on the assumption that the energy transmitted to the water during the slide is contained in a single, solitary wave. However, if one assumes that the energy is distributed evenly among  $m$  identical, solitary waves, the height  $H_m$  and the period  $T_m$  of the  $m$ th wave is given by

$$\begin{aligned} H_m &= H \cdot m^{-2/3} \\ T_m &= T \cdot m^{1/3} \end{aligned} \quad ) \quad m = 2, 3, 4, \dots \quad (4.10)$$

Equations (4.3) and (4.9) have been used to estimate the wave height for the Kitimat slide. In this estimation, the following values have been used :

$$D = D_o = 146 \text{ m}$$

$$D_s = 119 \text{ m}$$

$$\zeta = 305 \text{ m}$$

$$h = 24 \text{ m}$$

$$\mu = 0.01$$

$$\delta = 2$$

Then we obtain

$$H = 6.3 \text{ m}$$

and  $T = 10.7 \text{ minutes.}$

Note that the observed wave height (a crest of 4.6 m plus a trough of 3.6 m) of 8.2 m compares reasonably well with this estimate based upon very rough observed data and a simple analytical theory for a solitary wave. Note further that the solitary wave has the appearance of an elongated crest and no trough. There are no estimates available for the observed wave period.

## 5. ASYMPTOTIC THEORY.

Noda (1969, 1970) studied through analytical theory the linearized problem of vertical and horizontal landslides. A classic example of the vertical-landslide problem is the one that occurred in Lituya Bay, Alaska on July 9, 1958 (Miller, 1960). However, the Kitimat landslide, under discussion, is more closely related to the horizontal-landslide problem than to the vertical-landslide problem and, strictly speaking, it is a slide down an incline. Wiegel *et al* (1970) and Kuba (1969) studied vertical landslides through laboratory experiments, and Das and Wiegel (1971) modelled horizontal slides in the laboratory.

Noda (1969, 1970) obtained solutions for the surface gravity waves generated by a vertical wall moving through a body of water, to model the horizontal-slide problem. Noda's theory and the laboratory experiments by Das and Wiegel cover the following range of wave characteristics: linear oscillatory waves, non-linear transition, solitary waves and, finally, bores (Figure 5.1).

In the following, we will briefly summarize Noda's theory and apply it to the Kitimat landslide to obtain another theoretical estimate of the water-wave amplitude. The wave amplitude for the linearized form of surface gravity-waves in water of finite depth  $d$  for two-dimensional motion, with a time-dependent boundary is given in terms of an integral expression by Kennard (1949) and Noda (1969) as

$$\eta(x,t) = -\frac{2}{\pi} \int_0^{\infty} dK \left\{ \int_0^t d\tau \int_0^{-d} \frac{\cos \sigma I(t-\tau) \cosh K(z+d) \cos(Kx) \cdot F(z,t)}{\cosh (Kd)} dz \right\} d\tau \quad (5.1)$$

$$\text{where } \frac{\sigma^2}{I} = gK \tanh (Kd) \quad (5.2)$$

and  $\tau$  is an integration parameter for  $t$  and  $g$  is gravity.

The horizontal coordinate  $x$  is taken such that the wall is  $x = 0$ , and the origin of time is such that  $t = 0$  corresponds to the instant when the wall

starts to move. The wave number  $K$  is related to the wavelength  $\lambda$  through

$$K = \frac{2\pi}{\lambda} \quad (5.3)$$

The vertical coordinate  $Z$  is positive upward and the origin is at the undisturbed water surface. In (5.1),  $F(Z,t)$  is the time-dependent horizontal velocity boundary (wall) condition at  $x = 0$ .

Noda (1969, 1970) further simplified the problem by assuming that the wall movement function  $F(Z,t)$  is only a function of  $t$ . Then the innermost integral in (5.1) can be evaluated independent of the other two integrals. Next, he simplified the problem even further by allowing that the displacement time-history  $S(t)$  of the wall be prescribed in the following manner :

$$S(t) = \begin{cases} V_1 t + C_1 & \text{for } 0 \leq t \leq T_1 \\ V_{nt} + C_N & \text{for } T_{N-1} \leq t \leq T_N \\ S & \text{for } t > T_N \end{cases} \quad (5.4)$$

This simplification permits the second integral (over time) to be replaced with a summation using discrete time steps. Then the total solution is reduced to an integral that can be solved by Kelvin's method of stationary phase (Thompson, 1889), to give

$$\eta(x,t) = -\frac{2}{\pi} \int_0^\infty \frac{\tanh(Kd)}{K} \left( \sum_{n=1}^N V_n \cdot \sin^{T_1} \left( \frac{t-\tau}{T_1} \right) \right|_{T_{n-1}}^{T_n} \cos(Kx) dK \quad (5.5)$$

The asymptotic solution, described in this section, is much more difficult to apply to a practical case, such as the Kitimat landslide, than the analytical theory discussed in Section 4. Also, the asymptotic theory needs more input data, which is difficult to obtain (such as the speed of displacement of the material). Taking representative water depth  $d$  as 146 m and thickness  $S$  of the slide as 24 m, the value of  $S/d$  is 0.17. From Table 1 of Das and Wiegel (1971), this value of  $S/d$  corresponds to the oscillatory - non-linear-solitary region. Campbell and Skermer (1975) mentioned that the duration of the slide could have been about two minutes. The writers feel that this is probably too long and, based on several other slides, a more appropriate estimate is about half-a-minute. In any case, the solution is not very sensitive to the duration of the slide.

Suppose we are interested in the amplitude of the water wave at about 305 m distance from the slide area; (in the non-dimensional units of Das and Wiegel, this will correspond roughly to  $x^* = 2$  in their Figure 1). Then, using the stationary phase solution,  $\eta^*$  can be read out approximately as 1.4.

Then the value of  $n^*/d$  is obtained by multiplying this value with  $V^*$  (see page 10 of Das and Wiegel, 1971). If we assume that a 24 m-thick slide occurred in half-a-minute, then  $V = 24/30$  m per second and

$$V^* = \frac{V}{\sqrt{gd}}$$

Taking the water depth  $d$  as 146 m, and noting that the dimensional value of the wave height  $n$  is given by

$$n = n^* \cdot d$$

we obtain

$$n = 4.3 \text{ m.}$$

Considering the fact that this is a very approximate theory and the input data are uncertain, the calculated crest height of 4.3 m comes reasonably close to the estimated crest height of 4.6 m.

## 6. LABORATORY EXPERIMENTS.

Although we did not perform any laboratory experiments to simulate the water wave generation due to the slide in Kitimat Inlet, we will summarize in this section pertinent information on hydraulic experiments simulating slide-generated water waves. Also, we will briefly discuss the results of one hydraulic model simulation of the present case by Hecate Straits Engineering Ltd. (Anon, 1977). We will establish through the results of the laboratory experiments that, in hydrodynamic systems of the type considered here, the resultant wave-form is predominantly of the solitary type, which is the basis for the theoretical discussion earlier.

Kamphuis and Bowering (1972) performed laboratory experiments to study the vertical landslide problem. They showed that the wave characteristics depend mostly on the volume of the slide, and the Froude number of the slide upon impact with the water surface. Usually, the first wave is the highest and the wave period increases with time and the velocity of propagation of the wave can be approximated reasonably accurately by the solitary wave theory.

Wiegel *et al.* (1970) performed laboratory experiments in a channel (length 32 m, width 0.3 m, depth 0.91 m) to simulate water waves generated by landslides. These measurements more or less confirmed the earlier results of Prins (1958A, B) for the simpler initial condition of either a uniform elevation or depression  $h$  of the water surface over a length  $\lambda$ . If the length and height of the initial elevation (or depression) is not large compared to the water depth  $d$ , the waves behaved like a linear system (initial elevation or depression made no difference except for the sign). However, when  $\lambda/d$  or  $h/d$ , or both, became large, the cases of initial elevation were different from those of initial depression. The waves were non-dispersive (and hence the wave height did not decrease significantly as

the waves moved away from the source). At first, the waves looked like a solitary wave and, for greater values of  $\lambda/d$  or  $h/d$  or both, a series of cnoidal waves completely above the initial water-level were produced. Further increase of  $\lambda/d$  or  $h/d$  produced a bore.

The experiments of Das and Wiegel on horizontal landslides covered the range of wave characteristics from linear oscillatory waves, nonlinear transition and solitary waves to bores. They also deduced the relationships among the wave characteristics, the ratio of wall displacement to water depth, and a Froude number based on the average velocity of wall motion and  $\sqrt{gd}$ .

Seven sets of experimental runs were made. There are three relevant nondimensional parameters :  $s/d$  (ratio of wall displacement to water depth)  $T^* = T\sqrt{g/d}$  where  $T$  is the duration of the wall motion, and  $V^*$  (ratio of the average velocity of the wall to  $\sqrt{gd}$ ). These three parameters were varied so that the waves produced ranged from linear oscillatory waves to bores.

Davidson and McCartney (1975) performed a hydraulic-model study of water waves produced by landslides in Lake Koocanusa at Libby Dam in Montana. These experiments showed, that whereas at the dam site it is usually the first wave that is the highest, at other locations the first wave is not the highest.

Hecate Straits Engineering Ltd. (Anon., 1977) performed hydraulic-model studies of landslide-generated water waves in the Kitimat Arm. A total of five simulations was made; four of these dealt with hypothetical cases and one experiment was done to simulate the slide of April 27, 1975 in Moon Bay (Figure 6.1). An undistorted model of Kitimat Arm was constructed on a scale of 1:600. For the slide of April 27, 1975, the volume was assumed to be 6.3 million cubic yards (4.8 million cubic metres). The tests showed that an average slide velocity of 17 feet sec<sup>-1</sup> (5.2 m s<sup>-1</sup>) was the most appropriate, in the sense that the water waves produced in the hydraulic model most closely resemble the observed waves.

Casagrande (1977) clearly established that the submarine slide and, hence, the water waves started further north and east of Moon Bay. It can be seen that none of the five simulations of Hecate Straits Engineering Ltd. included a source in the area that is relevant for the slide of April 27, 1975.

SUMMARY.

In the submarine slide in the Kitimat Arm on April 27, 1975, at least  $10^7 \text{ m}^3$  of material was involved. It was estimated that the generated water wave probably was 8.2 m in range (4.6 m crest plus 3.6 m trough). A calculation based on a simple solitary wave theory gave an amplitude (i.e. elongated crest height) of 6.3 m, and a calculation based on an approximate asymptotic solution gave a crest height of 4.3 m.

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REFERENCES.

Anon. (1977). Final Report. Kitimat Arm Slides. Prepared for Hecate Straits Engineering Ltd., Vancouver, B. C. 29 pp.

Bjerrum, L. (1971). Sub-aqueous Failures in Norwegian Fjords. Norwegian Geo-technical Institute, Oslo. Publ. No. 88, 8 pp.

Brown, W. E. (1975). Underwater Subsidence at Kitimat: Sunday 27 April, 1975. Unpubl. man., Institute of Ocean Sciences, Patricia Bay, Fisheries and Environment Canada, Sidney, B. C. 8 pp.

Campbell, D. B. and N.A. Skermer. (1975). Report to B. C. Water Resources Service on Investigation of Sea Wave at Kitimat, B. C. Golder Associates, Consulting Geotechnical Engineers, 224 West 8th Avenue, Vancouver, B. C. 9 pp., and diagrams.

Casagrande, L. (1977). Kitimat Arm B.C. Slide of April 27, 1975. Unpubl. manuscript. Casagrande Consultants, 40 Massachusetts Avenue, Arlington, Mass. 30 pp. and Appendices.

Das, M. M. and R.L. Wiegel. (1971). Water Waves Generated by Horizontal Motion of a Vertical Wall. Hydraulic Engineering Laboratory, University of California, Berkeley. 16 pp. and diagrams.

Davidson, D. D. and B.L. McCartney. (1975). Water Waves Generated by Landslides in Reservoirs. J. Hydraulics Div., Vol. HY12, 1489-1500.

Kamphuis, J. W. and R.J. Bowering. (1972). Impulsive Waves Generated by Landslides. Proc. 12th Conf. Coastal Engineering, 13-18 Sept., 70 Amer. Soc. Civil Engineers, New York. pp. 575-588.

Kennard, E. H. (1949). Generation of Surface Waves by a Moving Partition. Quarterly of Applied Mathematics, Vol. 7, 303.

Koppejan, A. W., B.M. Van Wamelen and L.J.H. Weinberg. (1948). Coastal Flow Slides in the Dutch Province of Zeeland. Proc. Soc. Conf. on Solid Mechanics and Foundation Engineering, Rotterdam, Holland. Vol. V, pp. 89-96.

Kuba, E. H. (1969). A Hydraulic Model of Landslide-Generated Waves in Bays. Shore and Beach, Vol. 37. 49.

Miller, D. J. (1960). The Alaska Earthquake of July 10, 1958 : A Giant Wave in Lituya Bay. Bull. Seismological Soc. America, Vol. 50, 253.

Mitchell, R. J., K.E. Taui and D.A. Sangrey. (1973). Failure of Slopes under Wave Action. Proc. 13th Coastal Engineering Conf. July 10-14, 1972, Vancouver, Canada. Amer. Soc. Engnrs., New York. pp. 1515-1541.

Murty, T. S. (1977). Seismic Sea Waves : Tsunamis. Bulletin No. 198, Fisheries Res. Board of Canada, Ottawa. 337 pp.

Murty, T. S. and S.R. Durvasula. (1978). Tsunamis Generated by Landslides in Eastern Canada. Proc. of the Symposium on Tsunamis, Ensenada, Mexico. March 23-26, 1977. Edited by T. S. Murty. Manuscript Report Series No. 48, Marine Sciences Directorate, Ottawa. pp. 18-23.

Murty, T. S. (1979) (In press). Submarine Slide-Generated Water Waves in Kitimat Inlet, B. C. J. of Phys. Res.

Noda, E. (1969). Theory of Water Waves Generated by a Time-dependent Boundary Displacement. Hydraulic Engineering Lab., Tech. Rept. HEL-16-5, Univ. of California, Berkeley. 225 pp.

Noda, E. (1970). Water Waves Generated by Landslide. J. of the Waterways, Harbours and Coastal Engineering Division. Proc. of A.S.C.E., Vol. 96, 835.

Prins, J. E. (1958A). Water Waves due to a Local Disturbance. Proc. 6th Conf. Coastal Engineering, The Engineering Foundation Council on Wave Research, pp. 147-162.

Prins, J. E. (1958B). Characteristics of Waves Generated by a Local Disturbance. Trans. Amer. Geo. Union. Vol. 39, 865.

Striem, H. L. and T. Miloh. (1975). Tsunamis Induced by Submarine Slumpings off the Coast of Israel. Israel Atomic Energy Commission, Licensing Division. 23 pp.

Terzaghi, K. (1925). Erdbaumenchanik, Wien. Franz Deutiche.

Terzaghi, K. (1956). Varieties of Submarine Slope Failures. Proc. of the 8th Texas Conf. on Soil Mechanics and Foundation Engineering. 41 pp. Reprinted by Harvard Soil Mechanics, Series No. 52. Also published as Norwegian Geotechnical Institute Publ. No. 25.

Thompson, Sir W. (Lord Kelvin). (1887). On the Water Produced as a Single Impulse in Water of any Depth, or in a Dispersive Medium. Proc. Royal Soc., London. Ser. A. Vol. 43, Paper IV.

Wiegel, R. L. (1964). Oceanographical Engineering. Prentice-Hall Inc., Inglewood Cliffs, New Jersey. 532 pp.

Wiegel, R. L., E. Noda, E.M. Kuba, D.M. Gee and G.F. Tornberg. (1970). Water Waves Generated by Landslide in Reservoirs. J. of the Waterways and Harbours Division. Proc. of A.S.C.S. Vol. 96, 307.



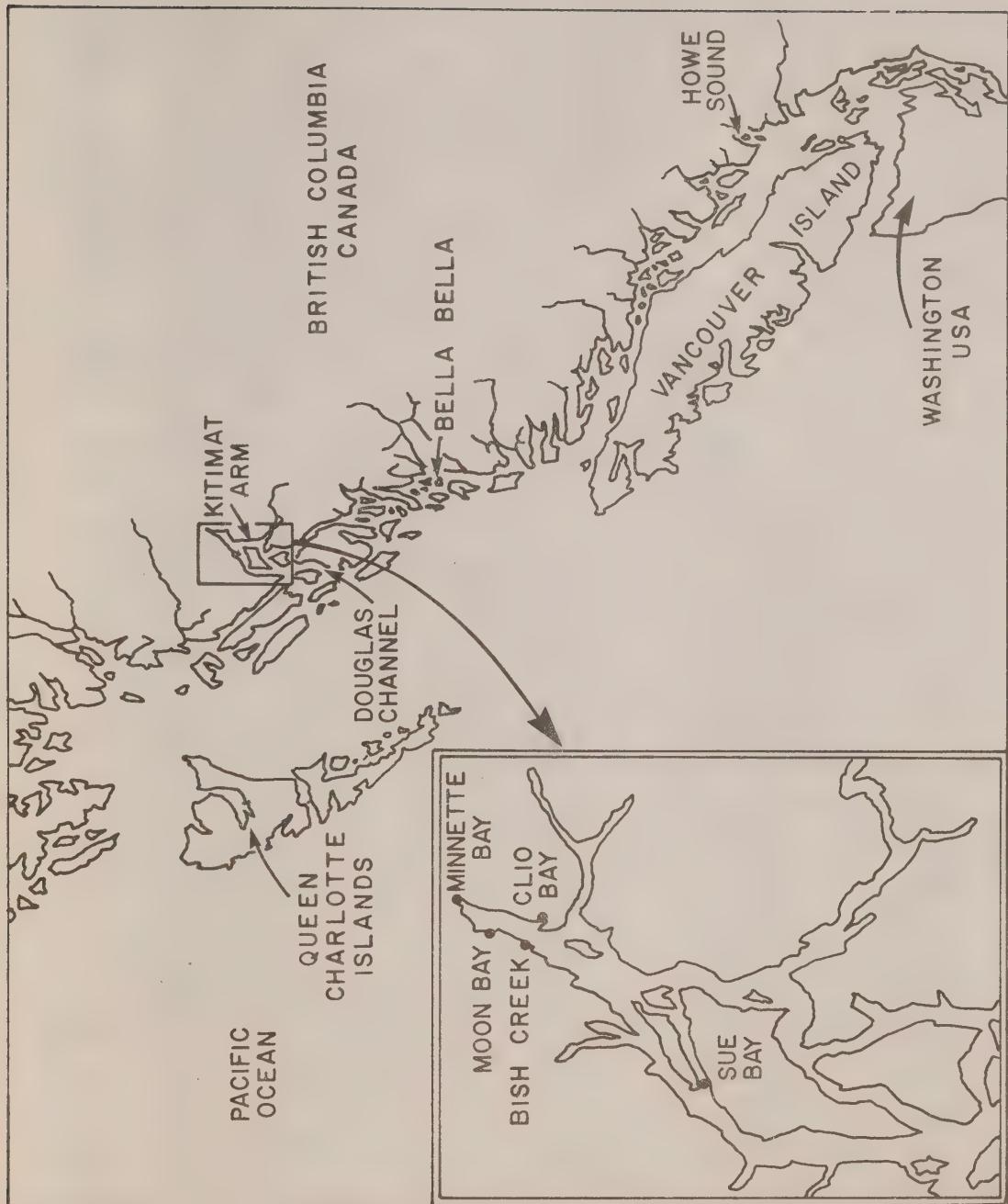


Figure 1.1 Geography of the Study Area.

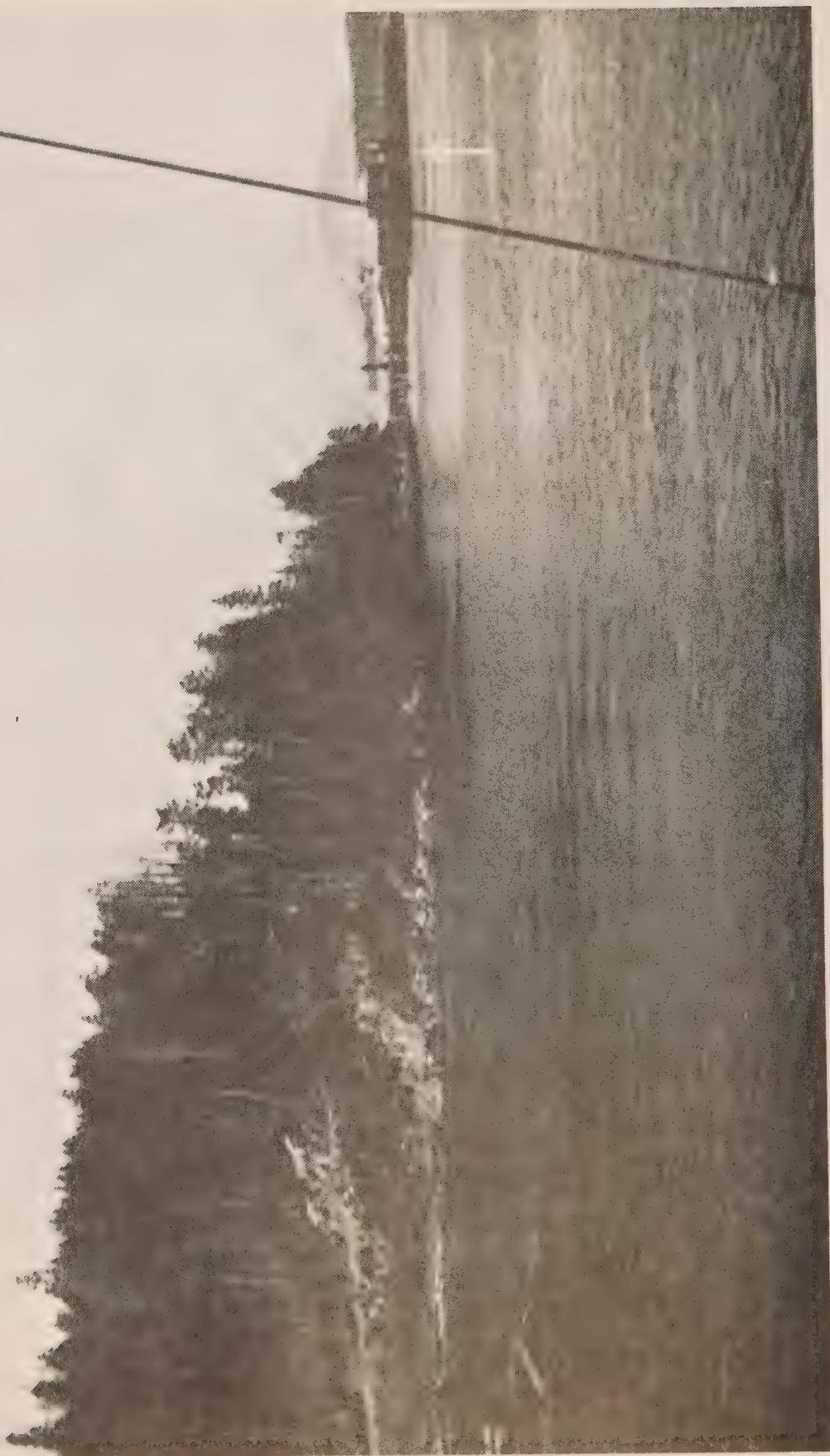


Figure 2.1 Moon Cove and Alcan Wharf (arrow) on April 9, 1975 (before the slide).



Figure 2.2 Moon Cove and Barge Loading Site (arrow) on April 9, 1975 (before the slide).



Figure 2.3 Northern end of Kitimat Arm on April 27, 1975. This is an actual photograph of the water wave taken from an aircraft which happened to be flying low over Kitimat Arm at the time of subsidence.



Figure 2.4 Moon Cove-Kitimat Arm on April 27, 1975 (after the slide).

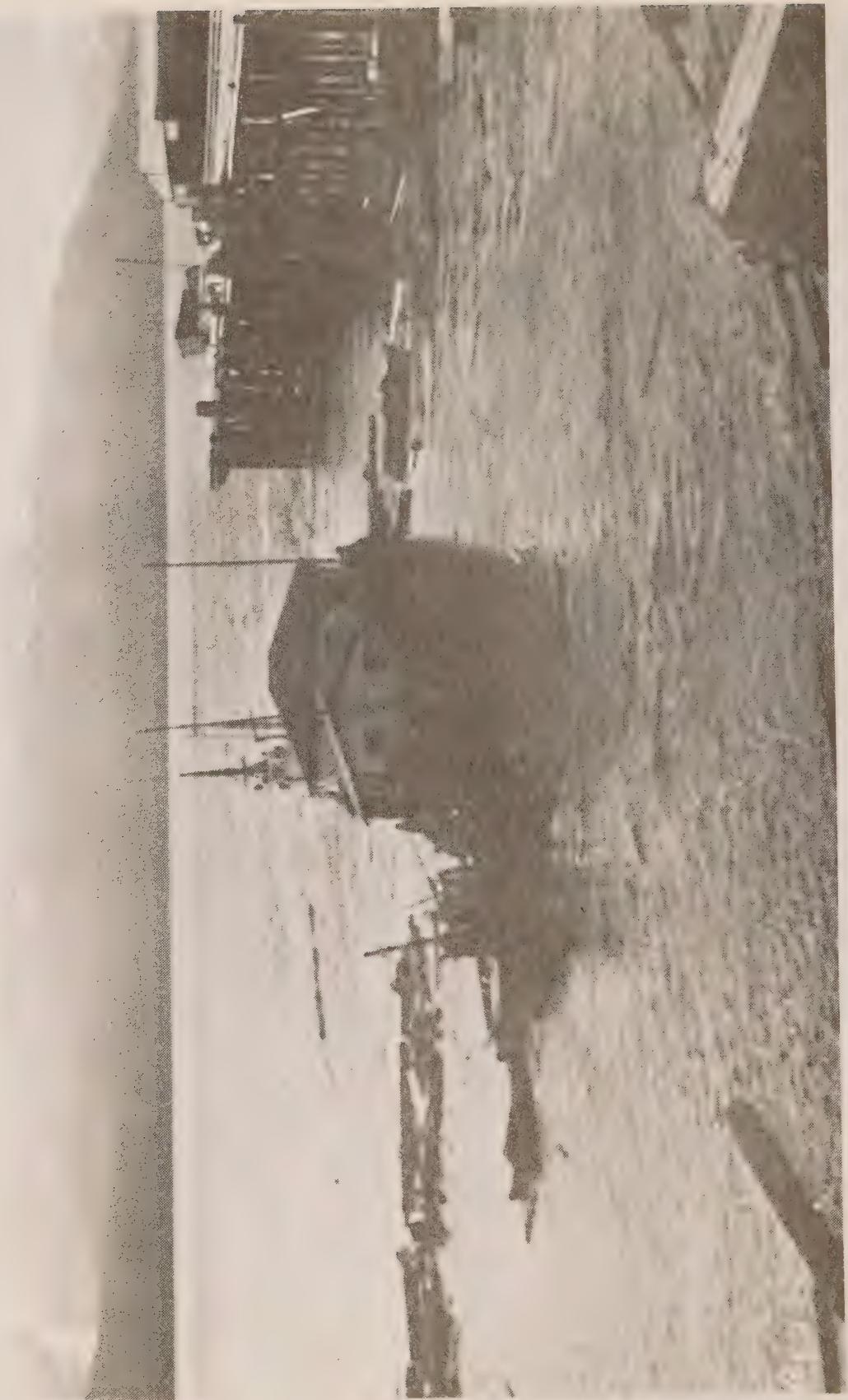


Figure 2.5 Riverton Barge and Alcan Wharf on April 27, 1975 (after the slide).

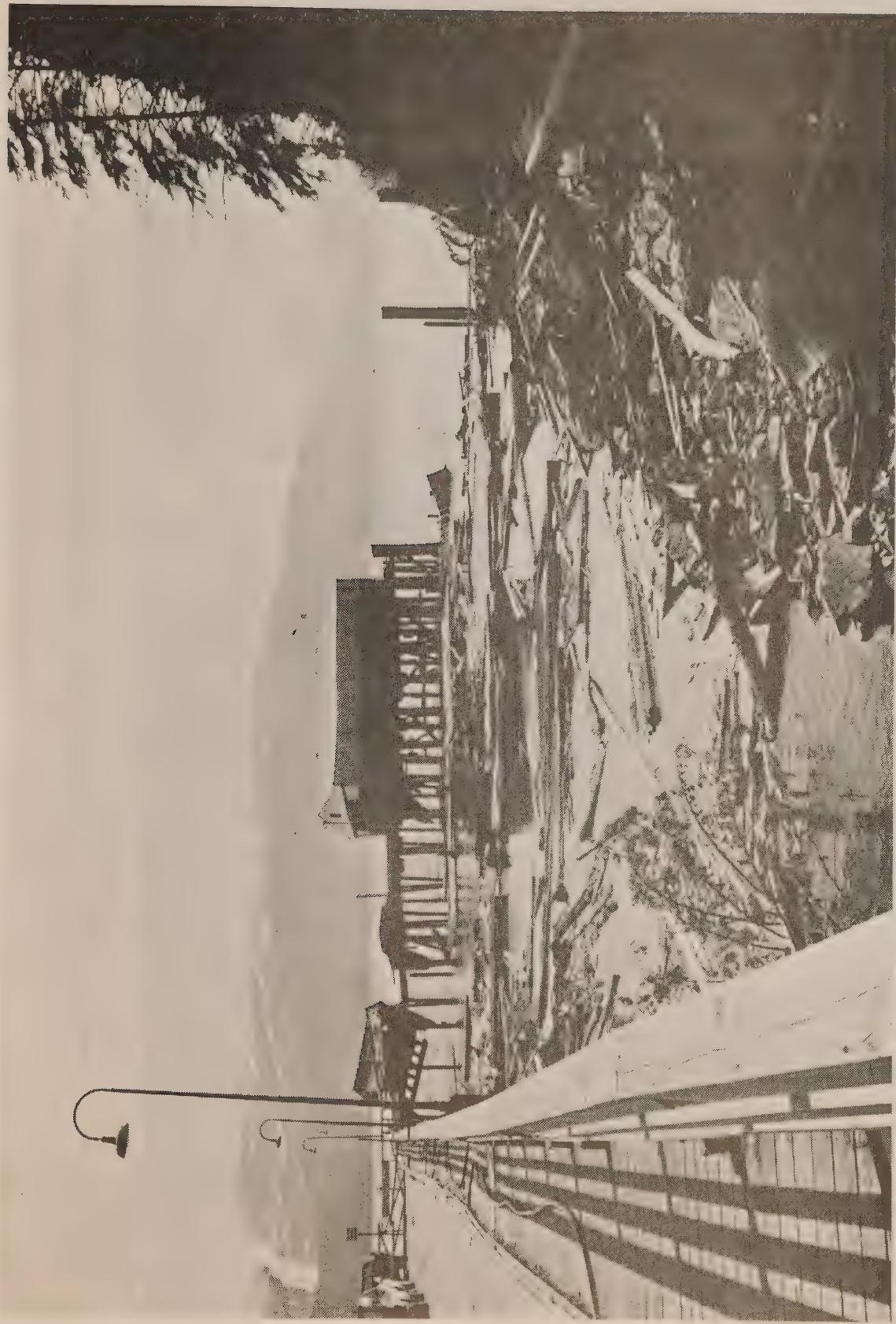


Figure 2.6 Alcan Wharf on April 29, 1975 (after the slide).

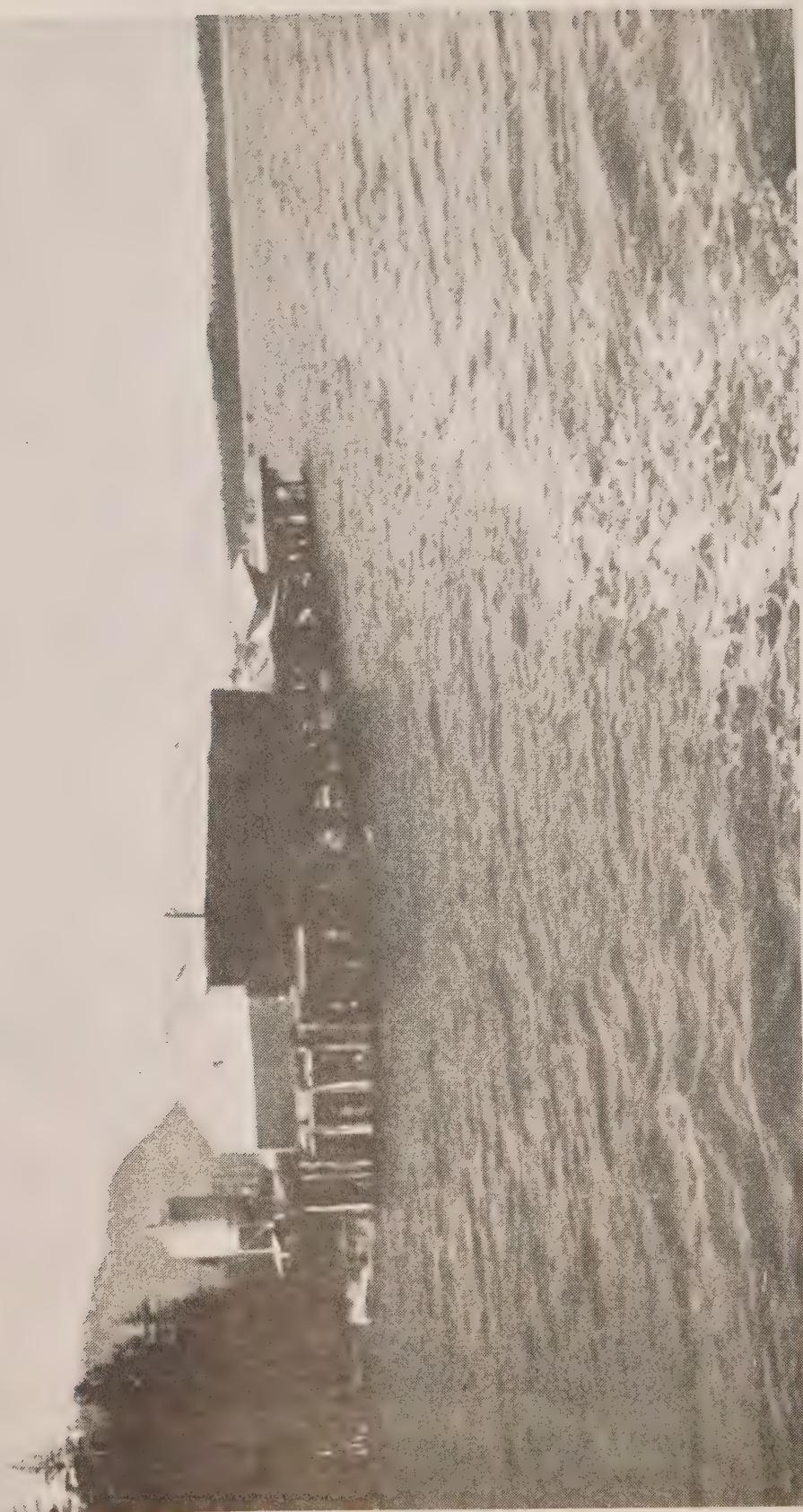


Figure 2.7 Another view of the damaged Alcan Wharf on April 29, 1975 (after the slide).

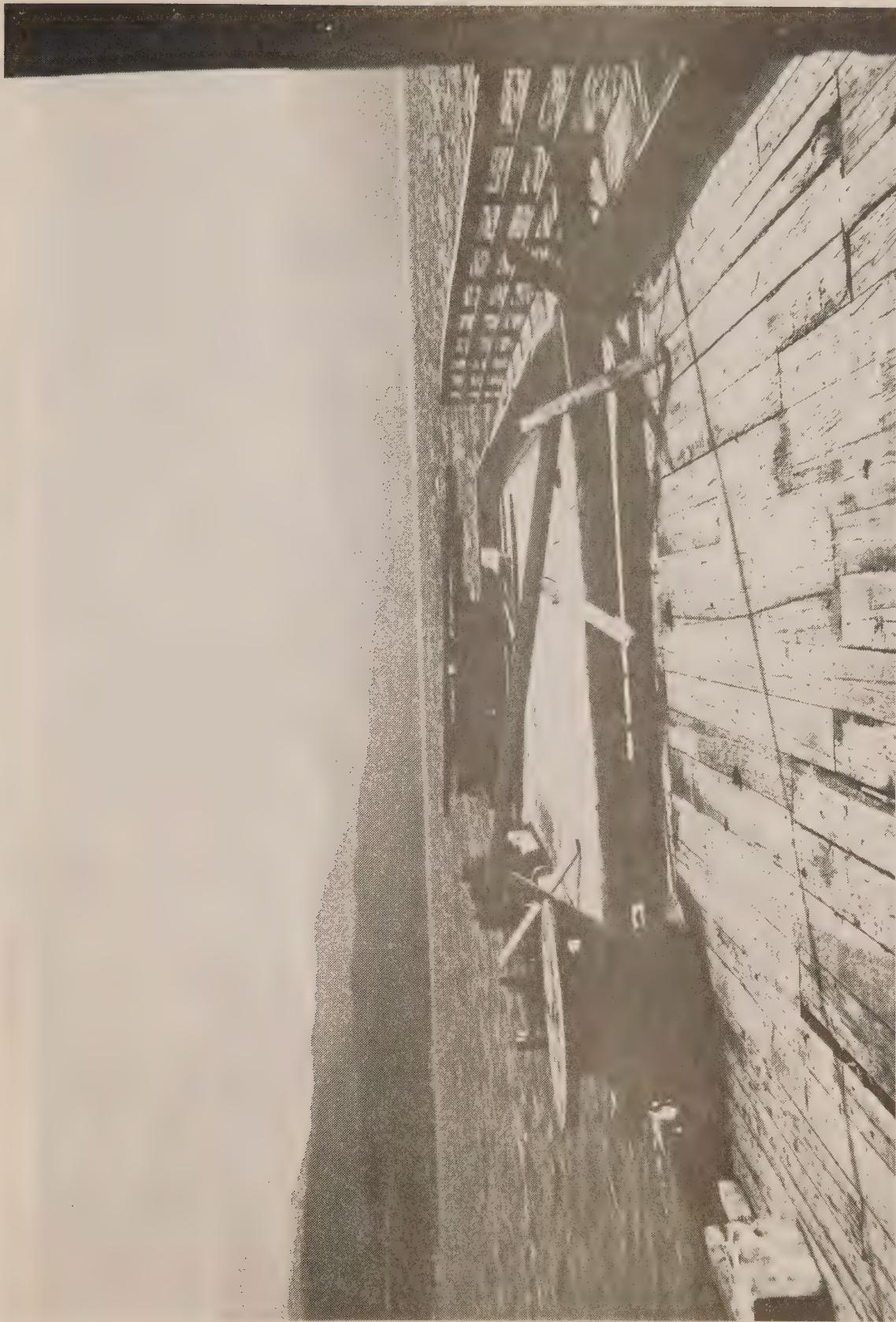


Figure 2.8 Remains of Alcan Wharf on February 23, 1977.

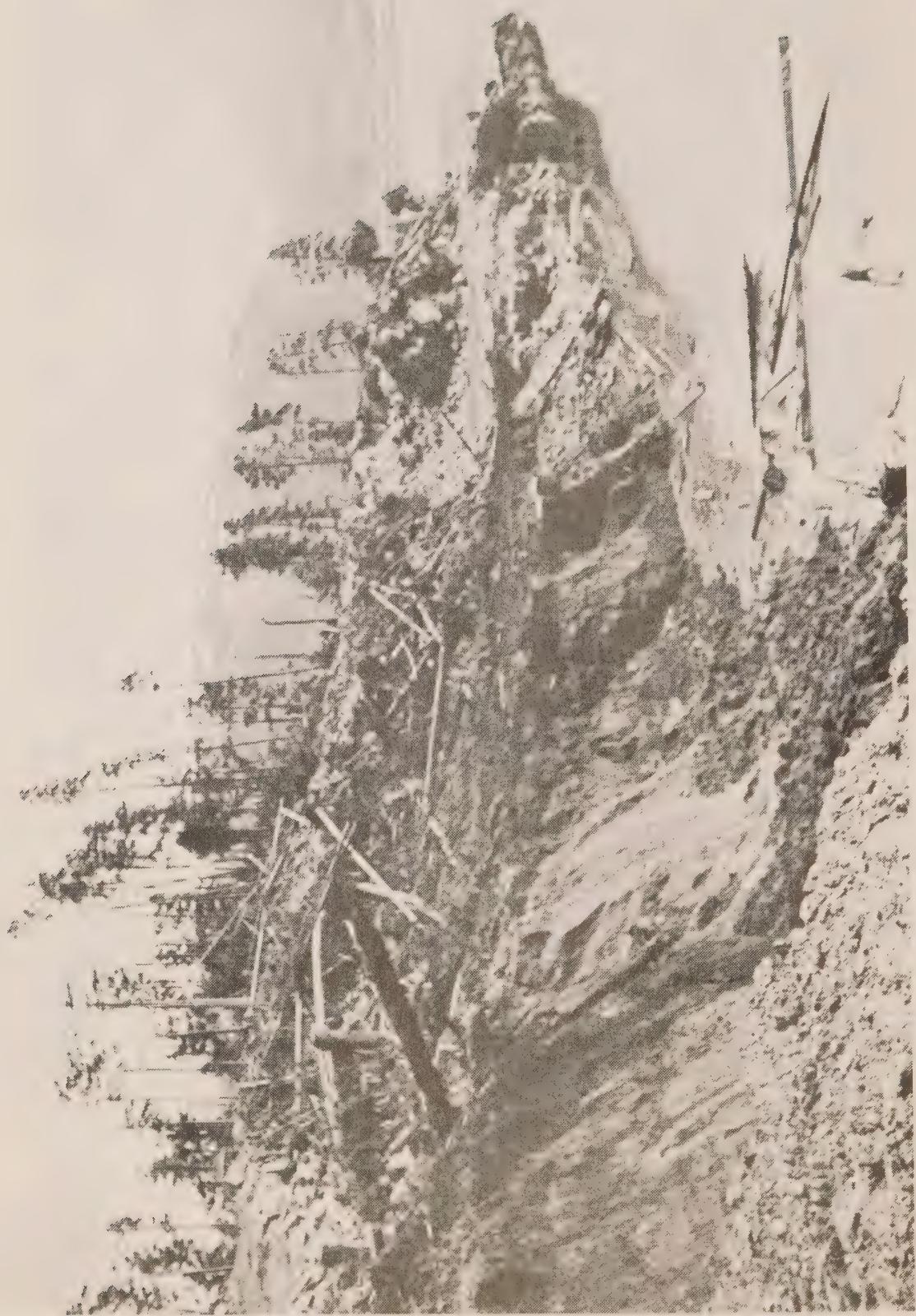


Figure 2.9 Moon Cove on April 29, 1975 (after the slide).

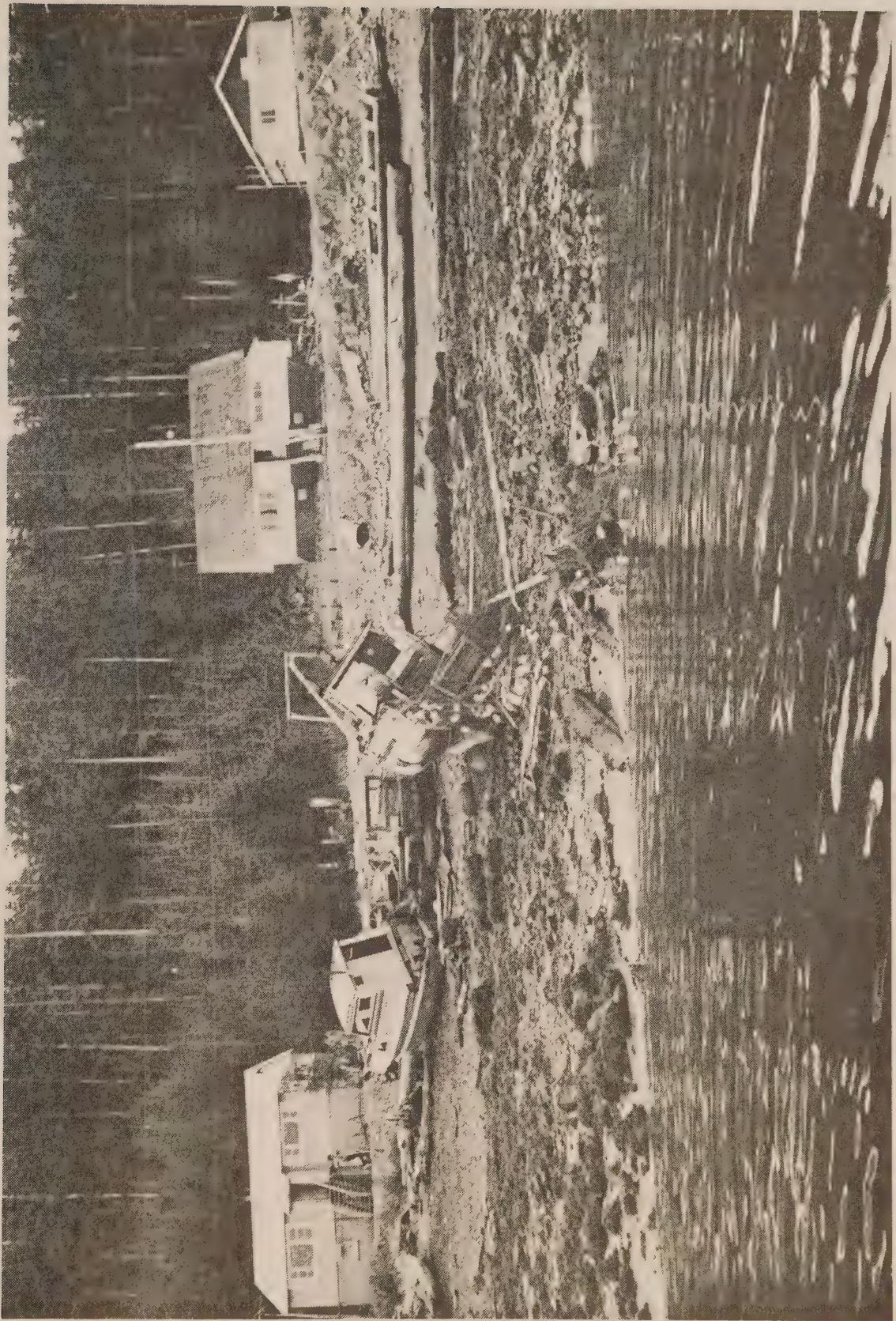


Figure 2.10 Fish-boat driven ashore at Kitimaat (Indian) village. Photo taken on April 30, 1975 (after the slide).

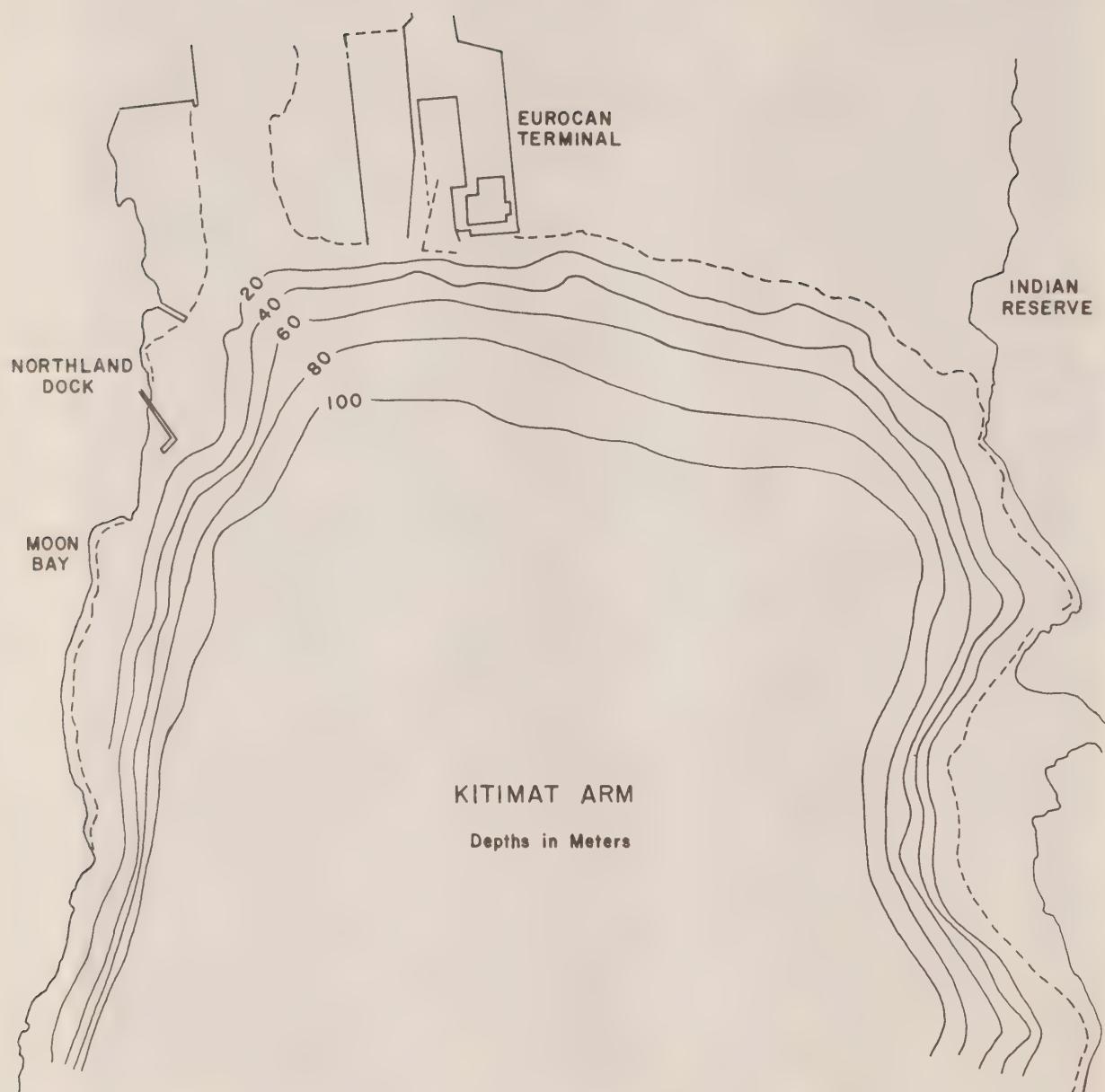


Figure 2.11 A Survey Chart of the northern end of Kitimat Arm before the slide (simplified).

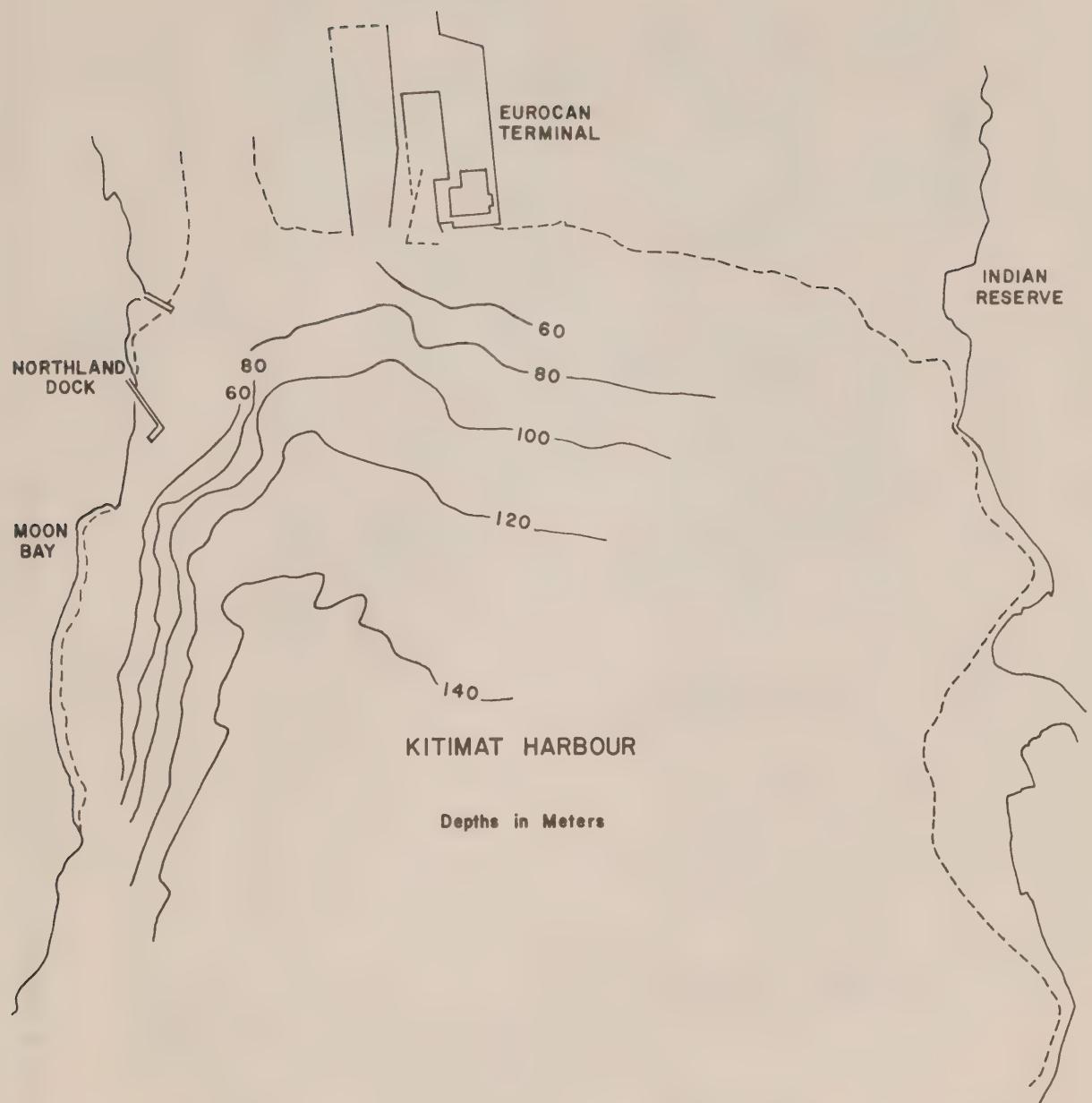


Figure 2.12 A Survey Chart of Moon Cove after the slide (simplified).

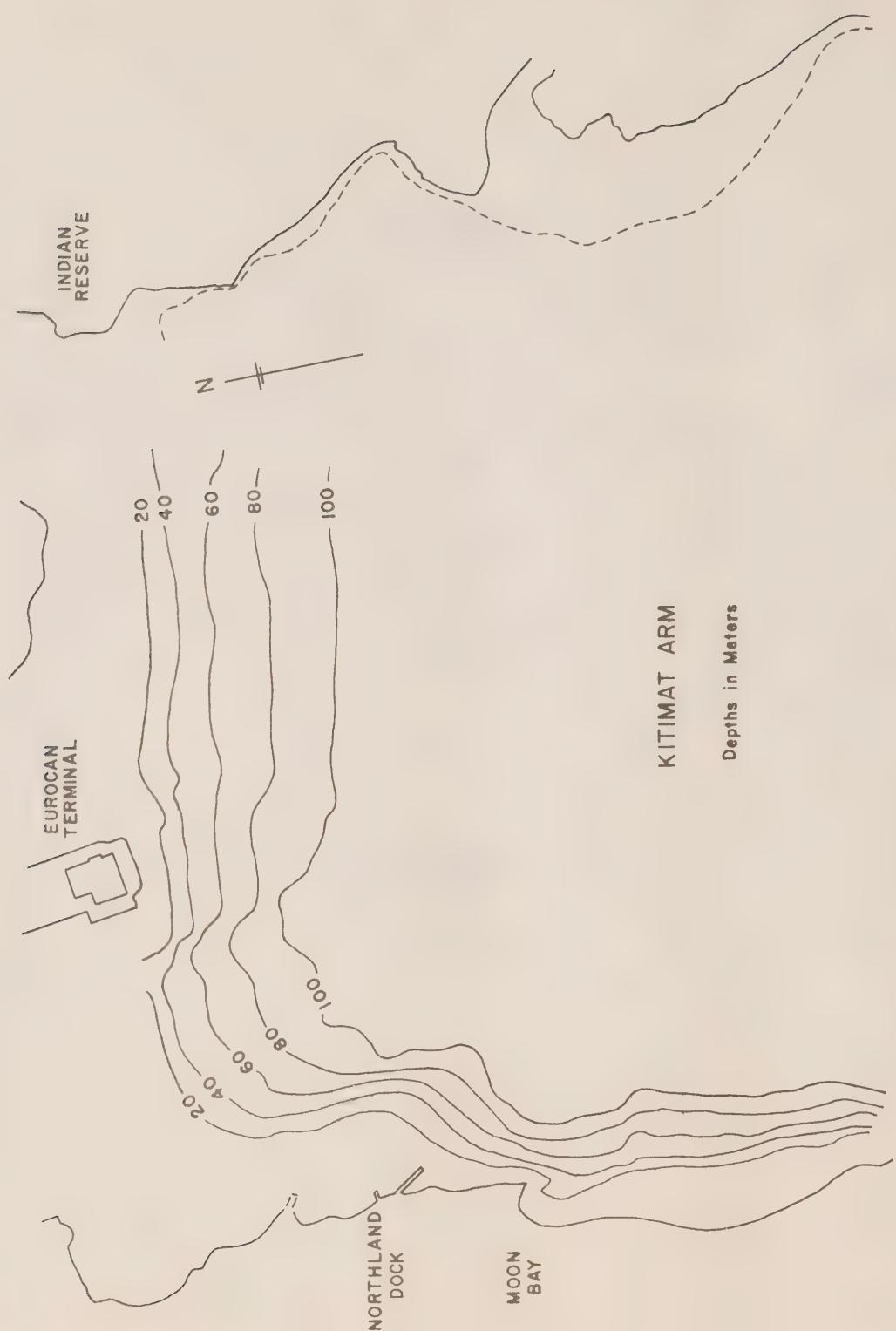


Figure 2.13 A Bathymetric Plan of part of Kitimat Arm, as compiled by McElhaney Associates (simplified).

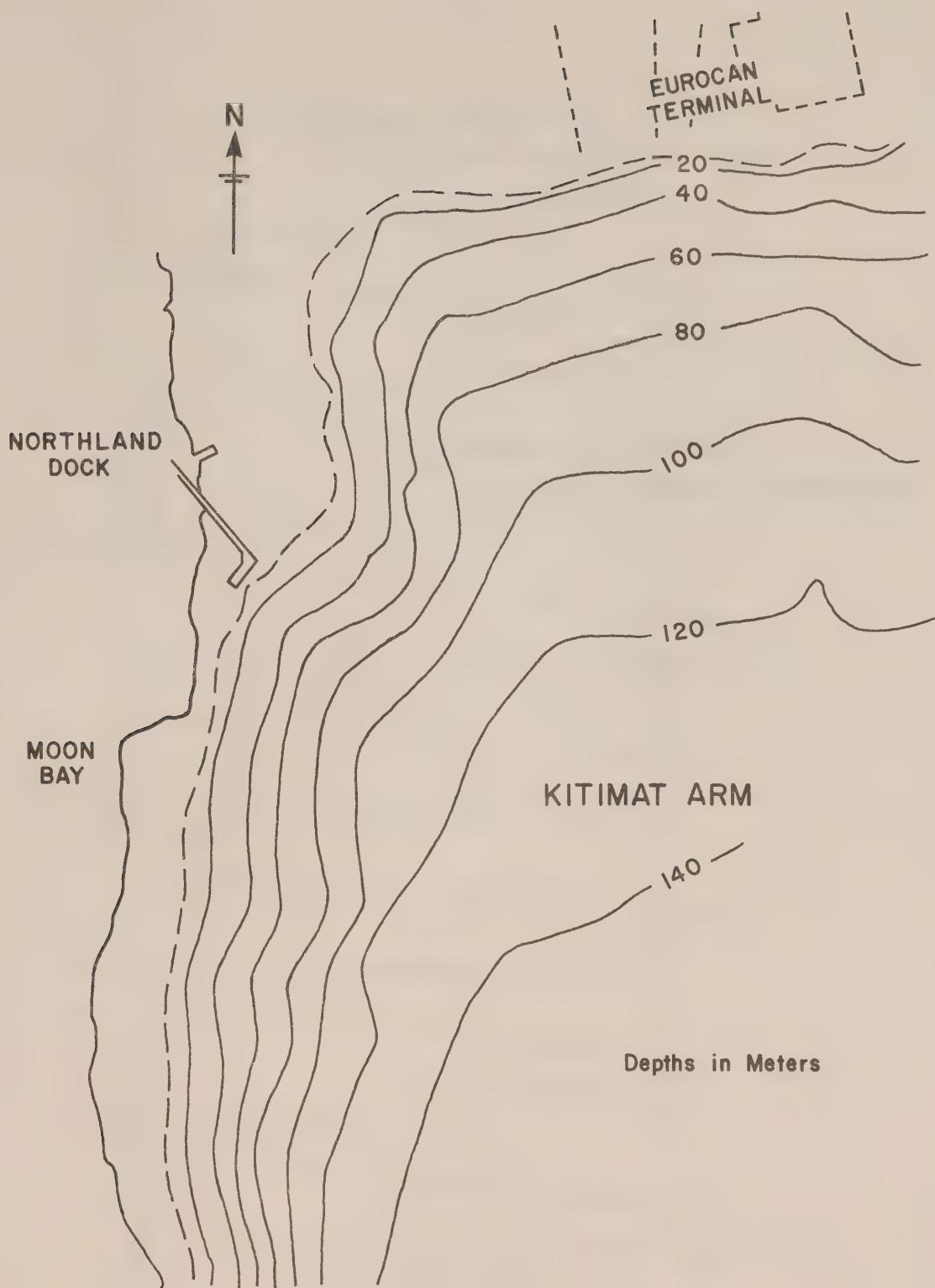


Figure 2.14 Locations where Casagrande Consultants did their survey.

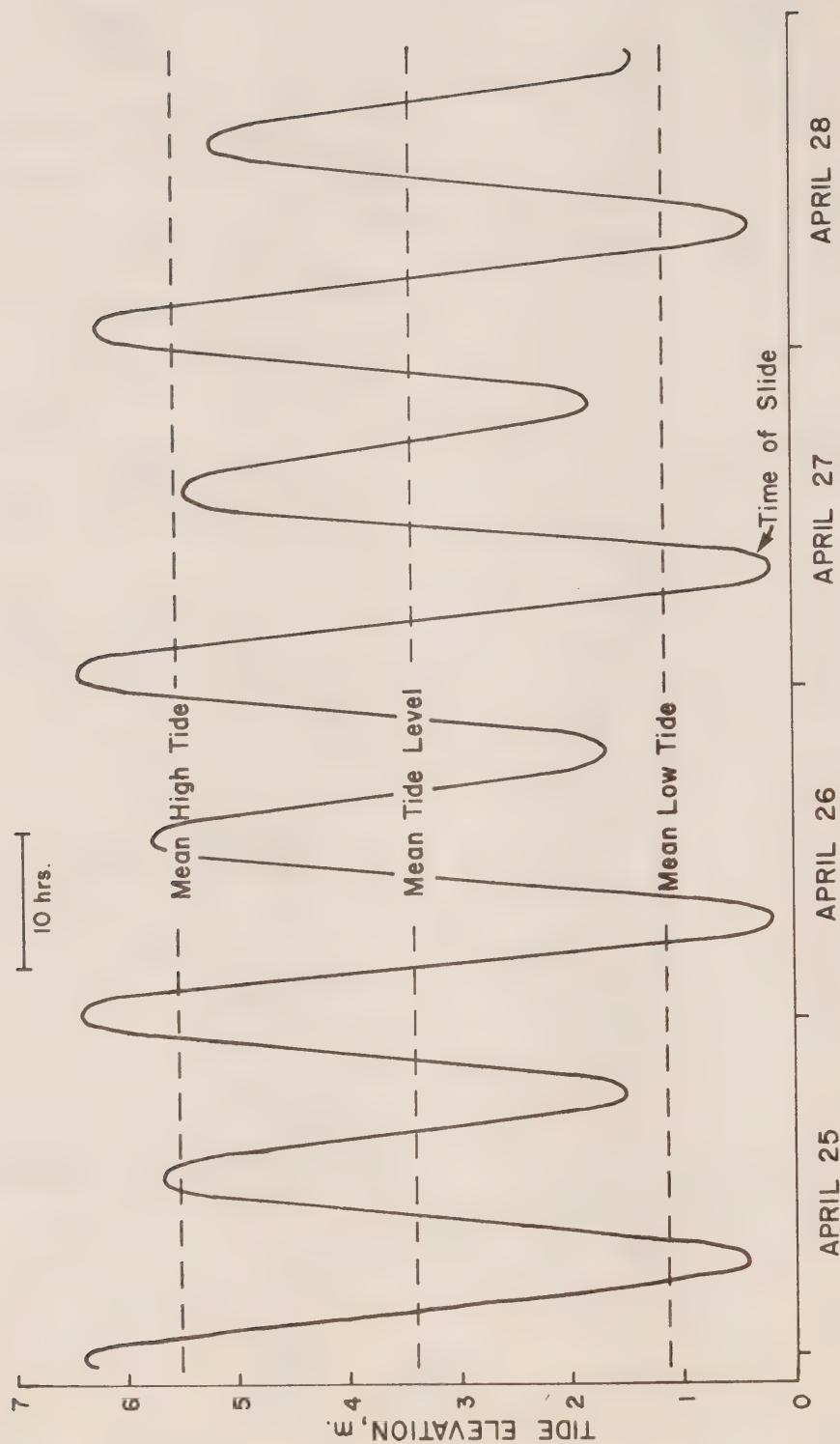


Figure 3.1 Tidal Curve for Kitimat (simplified from Casagrande, 1977).

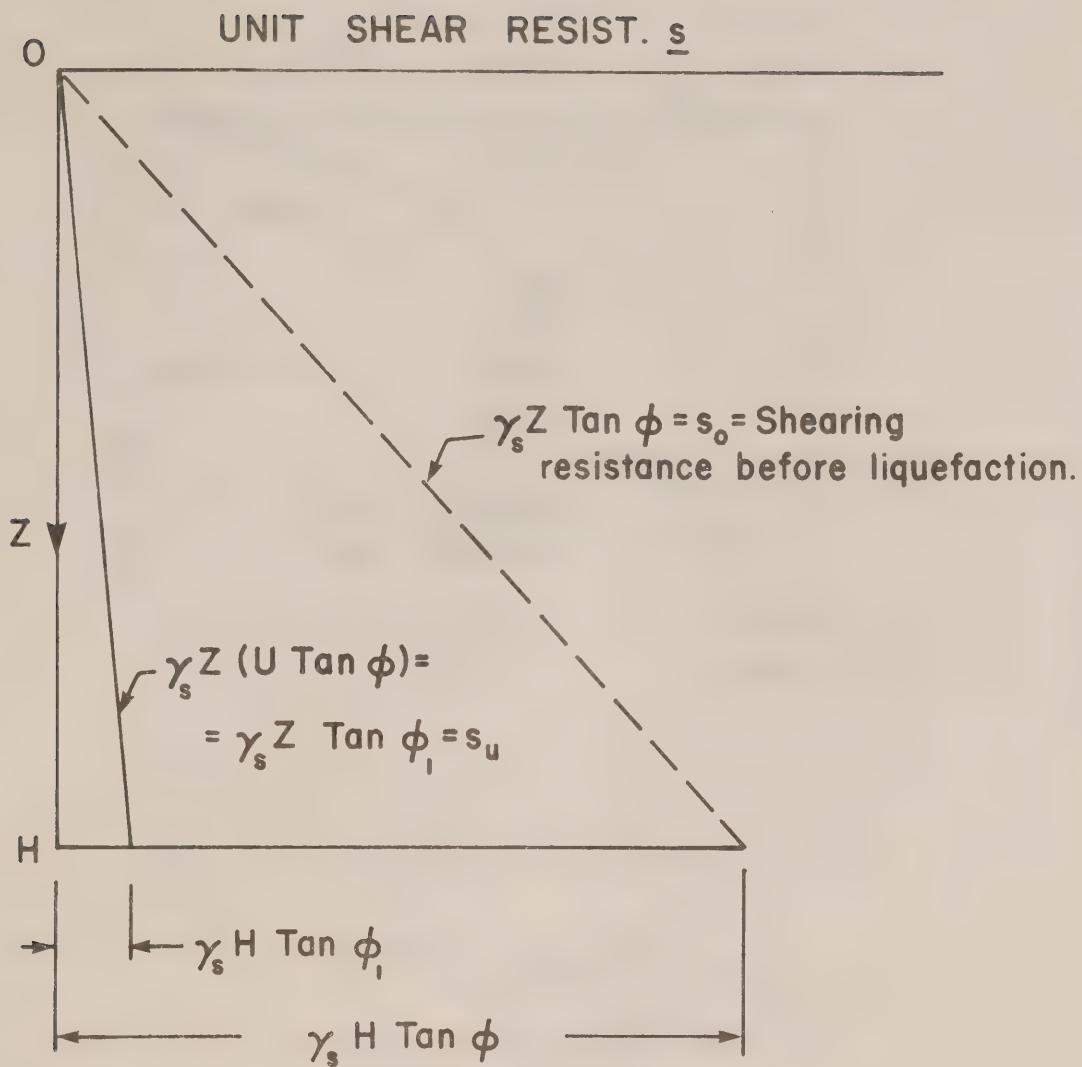


Figure 3.2 Relationship between depth  $z$  and shearing resistance of fine-grained cohesionless sediment with metastable structure before ( $s_o$ ) and after liquefaction ( $s_w$ ). From Terzaghi, 1956).

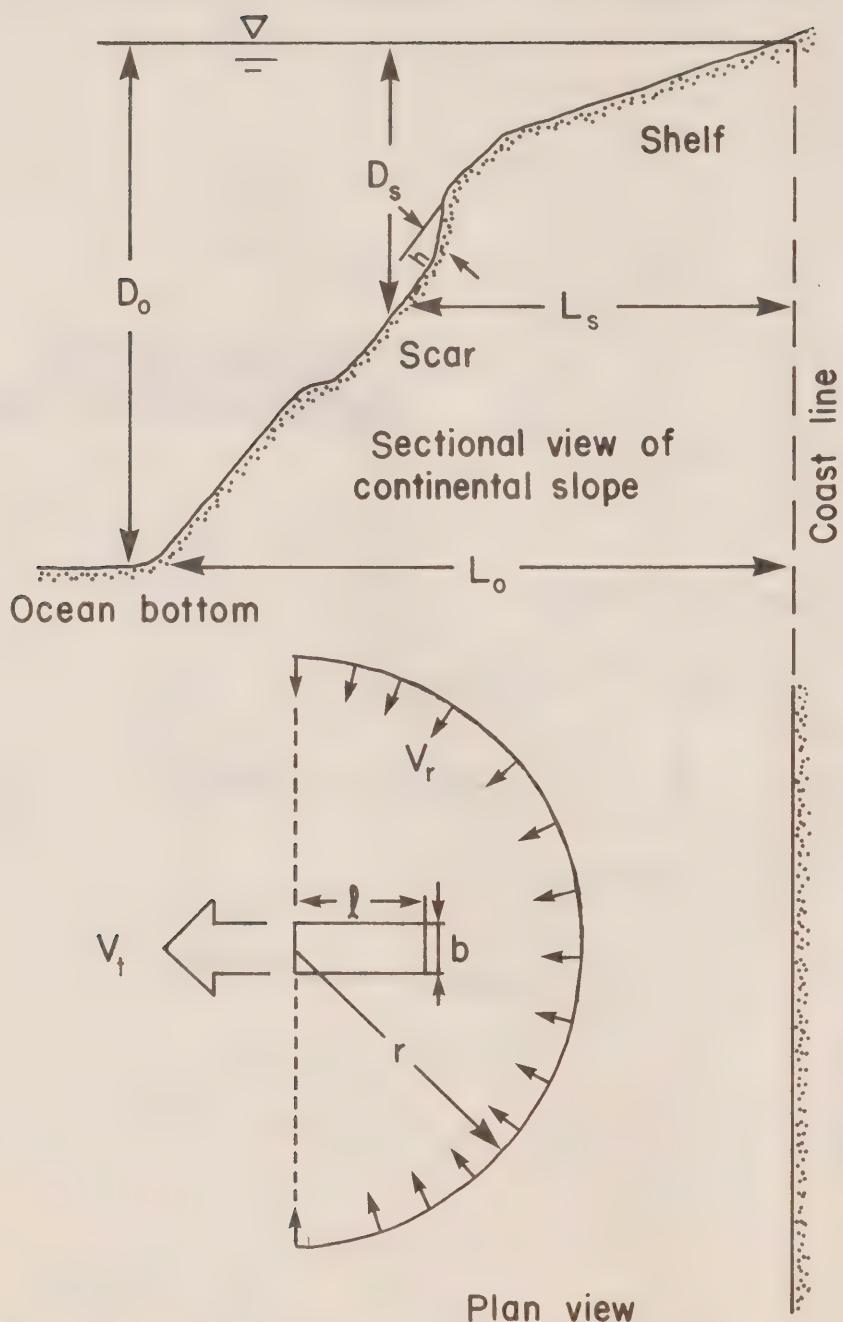


Figure 4.1 Schematic illustration of the Submarine Land Slide (from Striem and Miloh, 1975).

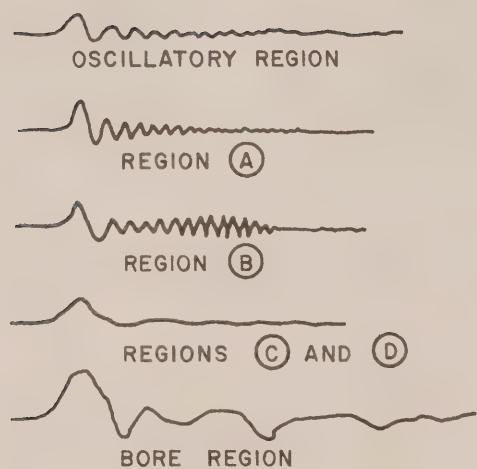
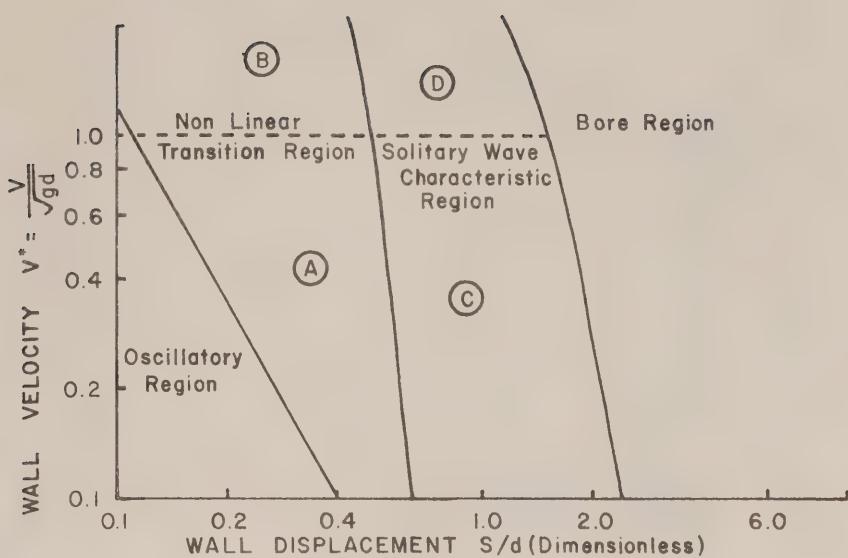


Figure 5.1 Various regimes of Impulsively-generated Waves (from Noda, 1970).

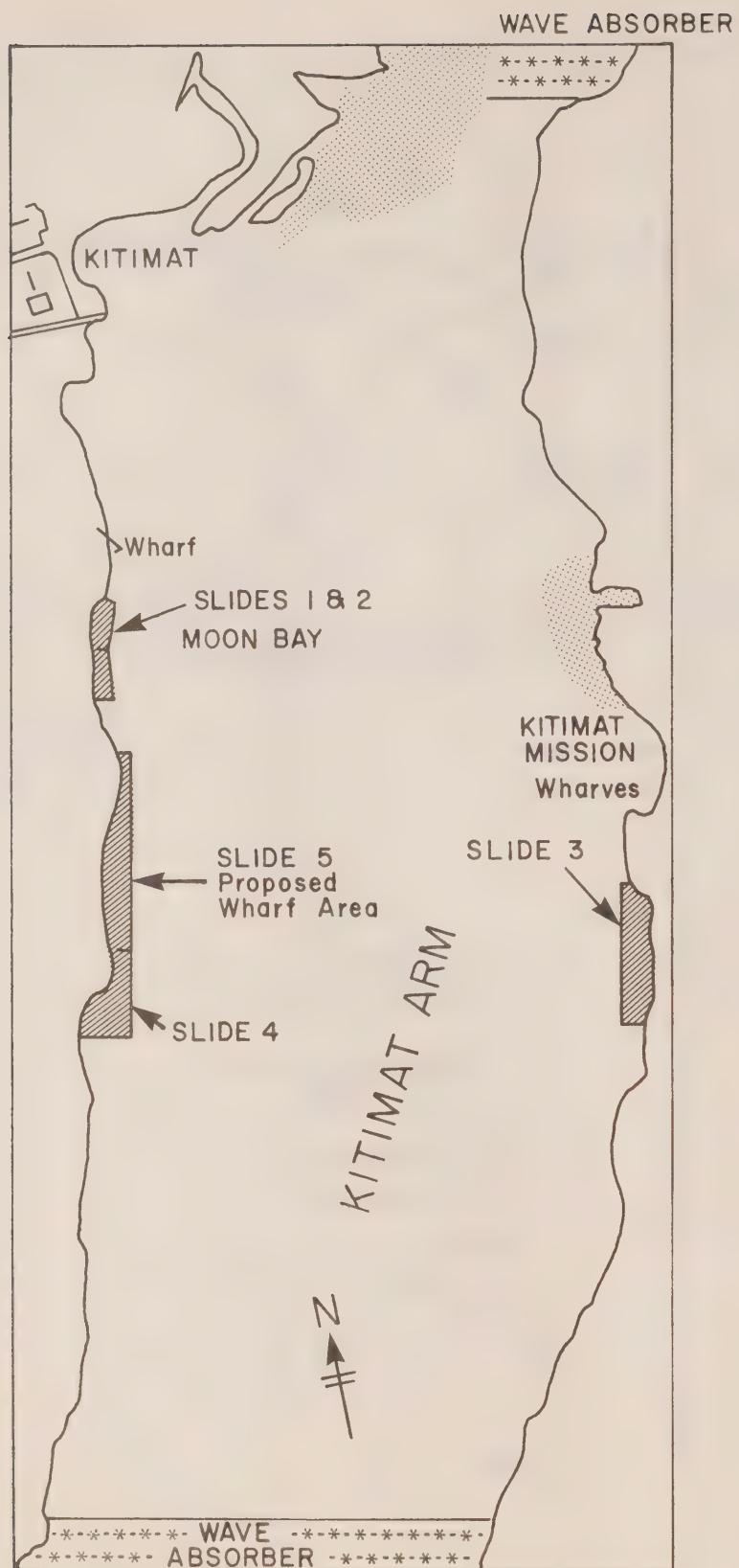


Figure 6.1 Location Map and Model Layout in the Hydraulic Experiments by Hecate Straits Engineering Ltd. (from Anon, 1977).











